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THE COMMENTARIES UPON THE APHORISMS OF Dr HERMAN BOERHAAVE,

The late Learned Professor of Physic in the University of LEYDEN,

CONCERNING

The KNOWLEDGE and CURE of the several DISEASES incident to HUMAN BODIES.

By GERARD VAN SWIETEN, M. D.

Translated into ENGLISH.

The SECOND EDITION.

VOL. VI.

LONDON:

Printed for ROBERT HORSFIELD, in Ludgate-Street;
AND
THOMAS LONGMAN, in Pater-Noster-Row.
MDCCLXV.

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THE

COMMENTARIES

UPON THE

APHORISMS

OF

HERMAN BOERHAAVE,

CONCERNING THE

KNOWLEDGE and CURE of DISEASES.

Of Thirſt in FEVERS.

SECT. DCXXXVI.

THIRST has for its cauſe a dryneſs of the body, an imperviouſneſs of the fluids, a ſaline, alcaline, bilious, and oily acrimony of them, or putrid excrements retained in the primæ viæ.

Perſons are ſaid to be thirſty when they have a ſtrong appetite or deſire for liquids, the ſenſe of which appetite every one knows, but the diſtinct idea thereof no one can deſcribe: But in the mean time no one doubts, but that when another perſon is thirſty, they perceive the ſame ſenſation, as when they feel drought in themſelves. But thirſt requires rather cold than hot drink, and generally ſubacid. Hence when people thirſt in the ſum-

mer heats, or in a febrile heat, they have a ſtrong deſire for the ſour whey of milk, the juice of citrons, and the like, and have an averſion for bitters, ſweet and ſpirituous liquors, &c. But as hunger ariſes when there is a neceſſity for reſtoring the ſolid and fluid parts which have been loſt by the actions of life in health, the perſon being admoniſhed by this ſenſe to take in food; ſo thirſt by a healthy neceſſity obliges people to take in watery liquors, to ſupply the deficiency of thoſe which have been exhaled, or to dilute and diſcharge by the uſual emunctories ſuch parts of the humours as tend to a deſtruction of the machine. Hence the adorable creator has conjoined the uneaſy ſenſation of hunger and thirſt, and has at the ſame time ordered that a pleaſure ſhall be perceived by people when they take food to allay their hunger, or drink to quench their thirſt; for that pleaſing and diſpleaſing ſenſe which accompanies ideas perceived, has a much greater influence upon us than what ought to be done or omitted by the moſt exact reaſoning. For neither prayers nor the threats of approaching death can oblige ſtubborn patients ſometimes to take the medicines which are ordered by the phyſician; but there is no need of perſuading a hungry or thirſty perſon to take food or drink. Hence it ſeems to be a juſt concluſion, that when the idea of thirſt is perceived in the mind, there are cauſes exiſting in the body which require the taking in of liquors. We are now therefore to conſider what changes in the body are the cauſes of thirſt, agreeable to what we are taught by obſervations.

Dryneſs of the body.] In a healthy perſon the whole ſurface of the external ſkin of the eyes, noſtrils, and internal parts of the mouth, with the tongue, fauces, &c. are moiſt, which is a circumſtance

circumſtance neceſſary to the natural functions of theſe parts; for ſince the whole body is perſpirable in every part, the moſt thin humour, which is expelled through the extremities of the ſmall exhaling veſſels, moiſtens the whole. When therefore this perſpirable moiſture is either abſent, or from ſome cauſe is hindered from paſſing through theſe ſmall veſſels, dryneſs attends, becauſe by the heat of the body, and of the ambient air, all the preſent moiſture is ſoon diſſipated. This dryneſs is eaſily known, when there is a ſcaly roughneſs of the ſkin, tongue, fauces, noſtrils, *&c.* after being deprived of their uſual moiſture: But at the ſame time ſuch a dryneſs is accompanied with thirſt. For when the moſt healthy perſon travels through a ſandy country in the ſummer heats, he ſoon perceives his whole mouth, noſtrils, *&c.* become dry, and is at the ſame time thirſty, becauſe the integrity of the functions requires a reſtitution of the humour, which had been exhaled from the body thro' the greater heat, by the taking in of liquors. Nor is it any objection to this that dropſical people, who have ſo great a collection of water in them, are nevertheleſs thirſty. For in theſe indeed a water is collected in the larger and ſmaller cavities of the body, but then in the mean time the other parts are deprived of their natural humidity. Thus we ſee that when the tumour of the abdomen increaſes daily in thoſe who have an aſcites, the other parts of the body are emaciated, and as it were waſted by a true maraſmus; and in ſuch alſo the tongue, mouth, and fauces are commonly very dry. And hence thirſt is by the ancient phyſicians eſteemed a very bad ſign in a dropſy, as we ſhall declare hereafter, becauſe it either denotes a putrefaction formed, or that all the water

of the blood is eſcaped out of the veſſels, and collected in the cavities of the body.

An imperviouſneſs of the fluids.] The fluids of the body are ſaid to be impervious, when they cannot paſs freely through thoſe ſmall veſſels, which they ought to pervade according to the laws of health. But this imperviouſneſs depends chiefly upon the cohering together of the particles of the fluids, into larger maſſes, though they were before ſeparated into much leſs parts (ſee § 115.) But among the cauſes which ſeparate the concreted particles of the blood, the principal are dilution, and a reſolution by the attenuating liquor, which is conveyed thereto, intimately mixed and ſhook together with them (ſee § 132.) Hence where there is ſuch a condition of the humours, thirſt is always perceived, whereby the perſon is admoniſhed from a healthy inſtinct of nature to take in ſome diluent and attenuating drink. This is the reaſon why thirſt is reckoned among the effects of inflammation (ſee § 382, No. 8.) And for the ſame reaſon, intenſe thirſt ſeems to attend in the cold fit of intermitting fevers, becauſe the blood then ſtagnates about the extremities of the veſſels (ſee § 577.) and frequently heſitating in the pulmonary artery at the ſame time, it often occaſions the moſt intolerable anguiſh.

A ſaline, alcaline, bilious and oily acrimony.] All our healthy humours (as we ſaid before upon another occaſion) are inſipid, or without acrimony, if we except the bile and urine, *&c.* which are partly excrementitious; and whatever parts of the humours degenerate much from this mild nature or diſpoſition, are not only uſeleſs, but even pernicious to the body: and therefore by a natural law ſuch are expelled from the body, by the inteſtinal, renal and other emunctories; and perhaps likewiſe

by

by inſenſible perſpiration. By ſtool are naturally diſcharged the compact and figured excrements, which remain out of the indigeſtible parts of the food, and humours flowing into the cavity of the ſtomach and inteſtines. For by urine and perſpiration a great quantity of watery liquor is diſcharged from the body, together with ſuch oily and ſaline parts of the blood, as are become acrid by too great an attenuation: And water ſeems to be the vehicle whereby they are diluted. Therefore as ſoon as a greater acrimony ariſes in our fluids, either from acrid ſubſtances taken into the body, or from a ſpontaneous degeneration of the humours themſelves, thirſt enſues, which calls for ſome thin watery drink, that ſo the acrimony may be diluted, and ſafely expell'd when diluted from the body, by the uſual paſſages. Thus if any perſon has eat a great quantity of any thing very ſalt for dinner, he will be very thirſty during the afternoon, until the muriatic acrimony is waſhed out of the blood by the diluent drink. The ſame thirſt is alſo experienced by thoſe who have taken a great quantity of ſtrong pickles, or ſauces of garlic, onions, muſtard, horſe-radiſh, *&c.* things which are already alcaline, or at leaſt inclined to degenerate into an alcaline acrimony. But as theſe acrid ſubſtances are either eaſily diluted and waſhed out, or not, ſo the thirſt differs in its intenſity and duration: And therefore when acrimony is wrapped up in an oily tenacity, it is with more difficulty waſhed out by watery drinks, and occaſions the moſt obſtinate thirſt, as is evident in thoſe who have eat fat bacon, or the beſt ſorts of fleſh preſerved with much ſalt. But oils alſo, how mild ſoever they may be in themſelves, may nevertheleſs by the heat of the body be changed into the very worſt rancid acrimony, and then the moſt intenſe thirſt

follows. They who eat too much fat meat, more eſpecially if the ſtomach is weak, and the body not addicted to hard labour, will belch up a mere oil ſome hours after dinner, which being ſpit into the fire raiſes a vivid flame; but at the ſame time it offends by its nauſeous bitterneſs, and often burns the fauces by its acrimony, which is almoſt ſuffocating. This is called a bilious acrimony, becauſe it much reſembles the bitterneſs of bile, even though it be very different from the bile itſelf, which is never merely oily, but ſaponaceous. Thus alſo the ſweeteſt butter by frying in a pan turns bitter, and acquires the like oily and bilious acrimony. But as ſuch acrid oils cannot be diluted by watery liquors only, and as they are confined in a great tenacity, therefore the moſt obſtinate thirſt ariſes from thence, incapable of being allayed, but by ſaponaceous, and eſpecially acid ſubſtances, ſuch as oxymel, the juices of garden fruits, jellies, or inſpiſſated juices of them, ſyrups, *&c.*

Putrid excrements in the primæ viæ.] By the firſt paſſages in the human body, as they are uſually called, we underſtand thoſe which firſt receive, contain and alter the aliments, and afterwards draw off from them nouriſhment for the whole body, while the remains which are uſeleſs are retained, and expelled from the body by another part of the ſame paſſages. By this denomination *Willis* [a] ſeems to have called the œſophagus, ſtomach, and the inteſtines, with their appendages: But by the appendages he underſtands the biliary and pancreatic ducts, with the mouths of the meſaraic veſſels [b]; for from theſe the humours may directly flow into the cavities of thoſe viſcera. But that author

[a] Pharmaceut. Ration. Part. I. Sect. I. cap. 2. pag. 5.
[b] Ibid. cap. 1. pag. 3.

author being about to treat concerning the action of medicines in the human body, ſo calls them, becauſe here the medicines firſt begin to operate. But it frequently happens that while a fever attends, putrid excrements are accumulated in theſe firſt paſſages, either from the innate humours of the body, which are conveyed thither, or from the ingeſted aliments ſpontaneouſly inclining to putrefaction; and while ſuch putrid matters lie in theſe paſſages, or are continually conveyed thither from the adjacent viſcera, a very intenſe thirſt tortures the patient, as we are aſſured from practical obſervations; altho' there may be no greater acrimony, nor any putrefaction in the blood and other humours, nor even any ſigns obſervable, denoting great dryneſs, or an impervioufneſs of the humours. Even ſometimes a fever is kindled from putrid matters lodging in theſe parts, tho' it did not exiſt before (as was obſerved in the comment to § 586.) But among all the humours, the bile moſt frequently, and the ſooneſt inclines to putrefaction, and is the ſooner corrupted, becauſe the air has always acceſs, when the bile is propelled into the cavity of the ſtomach and inteſtines; and together with thirſt it excites other febrile ſymptoms of the worſt kind, all which are ſoon removed, when the corrupt bile, here ſtagnating, is diſcharged by a vomit. In this caſe intenſe thirſt ariſes from a ſalutary inſtinct, that the putrid maſs may be waſhed out by plentiful drinking, or by irritating the ſtomach, to expel by vomit after taking a large quantity of ſome liquor, for generally a nauſea or ſickneſs of the ſtomach attends in this caſe. But this cauſe of thirſt is known from a foul tongue, from a putrid, bitter and diſagreeable taſte, with a ſickneſs at the ſtomach, and a loathing of food: But it is removed when this putrid matter is diſ-

charged either by vomit or ſtool; or elſe corrected by acids. *Helmont* very well remarks this cauſe of thirſt, where he argues in oppoſition to the opinion of the ſchools, who pronounced the eſſence of a fever to conſiſt in heat; and while no ſenſe of heat was perceived by the patient during the cold fit, they would nevertheleſs have it that a great heat lay concealed in the interior parts of the body, though inſenſible: They endeavoured to prove this wonderful paradox from the intenſe thirſt in the febrile cold, which they aſcribed to dryneſs, and proportionable to which they ſuppoſed the heat to be always exiſting in living people. But ſays *Helmont*, *At neſciunt hanc ſitim, non a calore, ut neque a ſiccitate manare, prout alias contingit in ſiti naturali. Ideo enim nec exhibito potu ſedari, quod regulariter fieri deberet, ſi a ſicco vel calido ſitis iſta oriretur. Fallax ergo ſitis, non autem frigus. Oritur namque ſitis ab excremento, quod facultatem iſtam ſenſitivam, ejuſque organon, male affectat, illuditque non ſecus, atque ſi repente magna ſiccitas adveniſſet. Nam ſolet acidum ſulfuris (quod in ſe ſicciſſimum & corroſivum) ejuſmodi fallacem ſitim delinire, non ſecus atque aqua ignem extinguit.* "They know not that this thirſt does "not proceed from heat, nor from dryneſs, as o-"therwiſe happens in natural thirſt, which is e-"vident, becauſe it is not allayed by the giving "of drink, which it regularly ought, if the thirſt "aroſe from heat, or dryneſs. The thirſt there-"fore deceives and not the cold fit. For the "thirſt ariſes from an excrement which greatly "injures this ſenſitive faculty and its organs, as "if they were ſuddenly affected with great dry-"neſs. For the acid of ſulphur (which is in itſelf "very dry and corroſive) uſually extinguiſhes this

"fal-

" fallacious thirſt, even as water puts out fire [c]." For although (as was ſaid a little before) thirſt in the cold fit of a fever is occaſioned from the impervioufneſs of the humours, yet it is ſufficiently evident, from the text aforecited, that excrements lodged in theſe paſſages may be the cauſe of febrile thirſt. For that organ the ſtomach, and eſpecially its orifice, which is continuous to the inteſtine called the pylorus, is by *Helmont* eſteemed the ſeat of the ſenſitive ſoul, as is evident from many paſſages in that author.

SECT. DCXXXVII.

HENCE therefore thirſt almoſt conſtantly denotes the preſence of one of theſe cauſes, (§ 633.)

When therefore thirſt attends in febrile patients, we ought always to ſuſpect that one or more of the forementioned cauſes are preſent; and it muſt then be carefully enquired what that is which produces thirſt in the patient, that from thence the cure may be directed ſo as to remove the known cauſe of the thirſt. For although there may poſſibly be other cauſes of thirſt in general, yet in febrile thirſt, concerning which we are here treating, we have not been able to obſerve more cauſes than thoſe beforementioned. Thus we read of the ſerpent dipſas, that a ſlight and ſcarce painful bite of it raiſed ſo great a thirſt in the young ſtandard-bearer Tyrrhenus, who followed the camps of *Cato*, ſo that it could not be allayed by any kind of drink: Hence the poet:

Non

[c] Helmont. De Febribus, cap. 1. No. 10, 11.

Non decus imperii, non mœſti jura Catonis
Ardentem tenuere virum, quin ſpargere ſigna
Auderet, totiſque furens exquireret agris,
Quas poſcebat aquas ſitiens in corde venenum, &c.
Scrutatur venas penitus ſqualentis arenæ,
Nunc redit ad ſyrtes, & fluctus accipit ore,
Æquoreuſque placet, ſed non ſibi ſufficit, humor.
Nec ſentit fatique genus, mortemque veneni,
Sed putat eſſe ſitim, ferroque aperire tumentes
Suſtinuit venas, atque os implere cruore [d].

It is indeed true that the ſtupendous effects of the like poiſons are ſufficiently apparent, but the manner in which they act upon the human body is concealed from us.

But ſometimes there have been ſufficient cauſes obſerved in diſeaſes, without producing any thirſt in the patient; but then this is always a very bad preſage, becauſe in ſuch a caſe the common ſenſory, being oppreſſed by the violence of the diſeaſe, is no longer affected; whence the greateſt danger is threatened. For as *Hippocrates* ſays (ſee the comment to § 1.) thoſe people are diſordered in their mind who do not perceive pain, when the cauſes of it exiſt in the body; and the ſame is alſo true of thirſt. For the ſame reaſon he likewiſe affirms, *Sitis præter rationem ſoluta in acutis malum.* "That the thirſt being extinguiſhed without any manifeſt cauſe in acute diſeaſes, is a bad ſign [e]." And in the ſecond patient of the third book of his epidemics [f] *Hermocrates* who periſhed on the twenty-ſeventh day, he obſerves that he had no thirſt, although he had a very

[d] M. Annaei Lucan. Pharſal. Lib. IX. [e] Prorrhet. Lib. I. Charter. Tom. VIII. pag. 739. Coac. Praenot. No. 60. ibid. p. 855. [f] Charter. Tom. IX. pag. 218.

very dry tongue, but then he was comatose, or insensible at that time: For in this patient the thirst went off without any manifest cause, the dryness of the tongue remaining; for if the tongue had appeared moist afterwards, it would have made one of the best presages, since the cause of thirst, namely the dryness, would then have been diminished.

SECT. DCXXXVIII.

THIRST therefore points out those ill consequences which may be presaged to follow as the possible effects of those causes which we thereby know to be present (§ 636, 637.)

Since therefore febrile thirst supposes some of the causes beforementioned (§ 636.) it is evident that all those disorders are to be feared which may be expected as the consequences of those causes. For the prognosis here varies according to the cause which produced the thirst, and cannot be known barely from considering the thirst only. Thus dryness denotes a deficiency of the thinner humours, whence the course of the rest through the smaller vessels becomes more difficult; and at the same time the small absorbing vessels of the venal kind being contracted by too much dryness, do not so easily admit the ingested humours; and the extremities of the exhaling arteries being likewise affected in the same manner, do not discharge the humours which ought to be by them expelled from the body, and hence all the functions hereon depending will be disturbed. But if the thirst proceeds from an imperviousness of the fluids, the disorder will manifest itself chiefly

chiefly about the extremities of the pulmonary artery, or veſſels of the encephalon, and hence anguiſh, difficulty of breathing, delirium, &c. may be juſtly feared. If the blood is infected with a ſaline acrimony, there is danger of the ſmalleſt veſſels being diſſolved, while the humours, charged with the very acrid ſaline particles, are forcibly drove through them with an increaſed velocity by the fever, and hence hæmorrhages, pains, &c. are ſo frequently obſerved in the muriatic ſcurvy. If the firſt ſhould ariſe from an alcaline, putrid, oily, or bilious acrimony, &c. all thoſe ill conſequences may be foreſeen (as we enumerated at § 85. and 86.) where we treated of the effects of a ſpontaneous alcaly both in the firſt paſſages, and in the blood.

SECT. DCXXXIX.

FOR theſe reaſons before mentioned, this ſymptom ought always to be immediately relieved, more eſpecially in acute diſeaſes.

Since therefore thirſt often proceeds from ſuch malignant cauſes, and the very worſt diſorders are to be juſtly feared from hence, it is ſufficiently evident, that this ſymptom ought to be immediately relieved; more eſpecially is this neceſſary in acute fevers, where the dryneſs, impervioufneſs of the humours, and putrefaction are increaſed by the diſeaſe itſelf.

But there has been another queſtion controverted amongſt phyſicians; namely, whether or no the thirſt in febrile patients, ought to be allayed by giving drink in as great a quantity as it may be deſired;

deſired; or whether neglecting this ſymptom, a diſeaſe from whence it ariſes, namely the fever, may be ſubdued, and conſequently the thirſt itſelf removed, while in the mean time the patient is often to be prohibited from the uſe of all drink, or elſe only a very ſmall quantity of drink allowed them; namely, leſt the efficacy of the remedies taken ſhould be diminiſhed, by being diluted with the quantity of the liquors drank plentifully. But we have ſeen before, in the hiſtory of fevers, that Aſclepiades acted the part of a torturer during the firſt days of the diſeaſe, as he thought that the patient's ſtrength ought to be weakened by watchings, intenſe thirſts, *&c.* inſomuch that he would not allow them even to waſh their mouth the firſt days: but at the ſame time, we alſo proved how much this cruel method of cure ought to be condemned. Celſus indeed, would have the patients treated in a milder manner; but yet he did not believe that it was uſeful to give drink during the whole time of the fever, and ſeems rather to incline to the opinion, that it is better for febrile patients to abſtain from drink. For after having ſaid that abſtinence from food may be more eaſily impoſed on ſuch patients, becauſe their ſtomach generally refuſes it, he adds as follows; *De potione vero ingens pugna eſt, eoque magis, quo major febris eſt. Hæc enim ſitim accendit, & tum maximè aquam exigit, cum illa periculoſiſſima eſt. Sed docendus eſt æger, ubi febris conquieverit, protinus ſitim quoque quieturam: longioremque acceſſionem fore, ſi quod ei datum fuerit alimentum: ita celerius eum deſinere ſitire, qui non bibit.* "But concerning "drink, there is a great controverſy, and the "more as the fever is greater. For the fever "kindles thirſt, and calls moſt powerfully for "water, when that liquor is the moſt dangerous.

"But

" But the patient is to be informed, that when the " fever is allayed, the thirſt will alſo immediate- " ly ceaſe, and that the paroxyſm will be longer " if aliment is given to him : thus the thirſt will " leave him ſooner who does not drink [f]." However, he believed it neceſſary to indulge the patient a little, becauſe even healthy people ſupport hunger better than thirſt; but for the firſt day, he would have no liquor given, unleſs the pulſe becomes ſo moderate, that food may be alſo given. And in another place [g] he would rather have the thirſt deceived than drink given. For he orders the patient to be ſo managed, *Neque potet, neque nimium ſiti crucietur. Os etiam ejus elui poteſt, ubi & ſiccum eſt, & ipſi fœtet, quamvis id tempus aptum potioni non eſt. Commadeque Eraſiſtratus dixit, ſæpe, interiore parte humorem non requirente, os & fauces requirere : neque ad rem, male haberi, ægrum, pertinere.* " As not to drink, nor yet to be tor- " tured with too much thirſt. For his mouth may " be waſhed when it is dry, and ſmells fœtid to " himſelf, although that time is not ſuitable for " drinking." And it is properly ſaid by Eraſiſtratus, " that often the mouth and fauces require " moiſture when the interior parts do not; nor " is it a thing of any conſequence, that the pa- " tient is uneaſy on this account." But when the mouth is dry and fœtid, the ſtomach and inteſtines labour under the ſame indiſpoſition, and equally require to be waſhed and moiſtened by taking in drink; for there is none of the cauſes of thirſt before mentioned (§ 636.) but what may be corrected by watery drinks under ſuch a regulation as will be preſcribed in the next aphoriſm. For thus the dry parts will be moiſtened, the impervious

[f] Celſ. Lib. III. cap. 6. pag. 128. [g] Lib. III. cap. 4. pag. 119.

pervious humours will be thinned, and divided by the interpoſition of the diluent water; all acrimony will be abſterged, and wholly enervated by diluting with the watery liquors. Hence Celſus has notwithſtanding been obliged to confeſs, *Ne illud quidem, ab Heraclide Tarentino dictum, ratione caret: ubi aut bilis ægrum, aut cruditas male habet, expedire quoque per modicas potiones miſceri novam materiem corruptæ*; "That what was ſaid "by Heraclitus of Terentus, is not without its "reaſon; namely, that when the patient is indiſ- "poſed from bile or crudities, it will be alſo pro- "per by moderate drinking to mix new matter "with that which is corrupted [h]."

But the method uſed by Hippocrates for the cure of fevers, was very different from this; for he not only aſſures us, that a moiſt diet is uſeful to febrile patients, but he likewiſe gave thin acidulated drinks of mead, oxymel, barley-water, *&c.* as is evident from his book concerning diet in acute diſeaſes, and concerning which, we ſpoke more at large in the general hiſtory of the cure of fevers.

But yet this method of Celſus, was unhappily again brought into practice by the phyſicians of the paſt age, who boaſted that they could ſubdue all diſeaſes either by their ſecret chemical medicines, or by ſweats, exhibiting the warmeſt ſudorifics, at their firſt undertaking the cure of every fever. But they prohibited their patients from all manner of drink, leſt the efficacy of the medicines ſhould be weakened by their diluting in the watery liquors drank. But it is evident enough how miſerable the condition of the patients muſt have been, who were treated in this method. For although the body was torrified with the febrile

[h] Lib. III. cap. 6. pag. 128.

heat, and fuel was added to the fire by the exhibition of the warmeſt medicines; yet they were not allowed even to wet their lips with any kind of drink. Nor yet (which may ſeem wonderful) did the phyſicians depart from this method, though they knew that many of their patients, deſpiſing the threats of death, were obliged by their intolerable thirſt to take in great plenty of drink, which they extorted from their keepers, either by force or by entreaties, being attended with very good ſucceſs. Helmont, although he boaſted of being able to ſubdue all kinds of fevers in a few days time by ſecret medicines, was yet wiſer in this particular; *& deteſtabatur in febribus abſtinentiam a potu. Nam ſi febris ſit calida, & ſiticuloſa, privetur autem potu humectante, depopulatur cruorem, & ſolidarum partium alimenta, cum viribus. Etenim, uti licet veſicam exonerare, quoties urget etiam importuna neceſſitas, ad hoc non petita a Medico venia: pariter quoque eſt bibendum, quoties monet neceſſitas: cum unum non ſit magis naturæ conſonum quam aliud: ſitis autem ſtricta lex, & rupta mandati obedientia, jam millies Medenti opprobrium attulit.* " and abhorred abſtinence from drink " in fevers; for if the fever is hot, and attend- " ed with thirſt, by depriving the patient of " moiſtening drink, the blood is impoveriſhed, " and the ſolid parts deprived of both their ſenſe " and nouriſhment. For as there is a licence to " empty one's bladder whenever there is occaſion " without aſking the leave of the phyſician for " that purpoſe, ſo likewiſe ought the patient to " have the privilege of drinking whenever he " has a neceſſary occaſion: for one of theſe is not " more conſonant to nature, than the other: Add " to this, that keeping to the rule of drinking " when there is drought, and breaking through

" the orders enjoined on them for abstinence, has " a thousand times disgraced those who undertook " the cure [i]." But at present, at least in these countries, this cruel method is rejected almost by every physician, and drink enough is allowed to the thirsty patients. But what is more particularly to be observed concerning this symptom, will be explained under the following aphorism.

SECT. DCXL.

THIS symptom is relieved, 1. by the drinking of watery, subacid, nitrous, and emollient liquors made warm, and taken frequently in a small quantity at a time. 2. By fomenting, washing, and gargling the nostrils, mouth, and fauces, with liquors of the same kind. 3. By fomentations, epithems, and cataplasms of the like kind applied to the hypochondria, and secured round the body. 4. By injecting clysters of the like kind, and causing them to be retained for a considerable time.

1. Patients who are thirsty desire drink, but by a natural instinct they have always an appetite to such as is thin and watery, and an abhorrence to strong ale, rich wine, *&c.* And even in healthy people it is observed, that when they are thirsty in great summer heats, they are delighted only with thin drink; and therefore it is no wonder if they have the same inclination in the heat of the fever. Perhaps for this reason Hippocrates [k] was unwilling to give milk alone to allay thirst, but mixed with

[i] Helmont. De Febribus, cap. 12. N°. 3. p. 772.
[k] Aphor. 64. Sect. V. Charter. Tom. IX. pag. 237.

three or four times as much water, it very well allays the thirſt of febrile patients. But as in fevers by the increaſe of the circulation, the ſalts and oils of the blood become more acrid, and incline to putrefaction, and even frequently putrid excrements are lodged in the primæ viæ; therefore ſubacids are very well added to watery liquors, which reſiſt all putrefaction, and are the beſt remedies againſt thirſt from that cauſe: hence the juices of citrons, oranges, cherries, currants, &c. are ſo ſucceſsfully mixed with watery liquors as a drink, and are very much deſired by thoſe who are thirſty in fevers. To theſe add nitre, and the various preparations thereof which are kept in the ſhops, becauſe they likewiſe reſiſt all putrefaction, and conduce much to diſſolve the inflammatory impervioufneſs of the humours. But to remedy the too great dryneſs, and alleviate the acrimony of the humours, barley, oats, or the like farinaceous grain are boiled in water, which are likewiſe oppoſite to putrefaction, as they ſpontaneouſly turn ſour.

But almoſt every one who is thirſty in a fever deſires cold drink, and as the natural inſtinct of patients in diſeaſes is with reaſon much regarded, it would therefore ſeem that in this particular, the patient ought therefore to be indulged ſometimes with cold drinks, which they ſo much requeſt. It is indeed true, that cold drink is the moſt pleaſing and refreſhing, but then it has many bad conſequences, as appears from the moſt certain obſervations. For if it be conſidered that cold drink, eſpecially if drank plentifully, conſtringes the adjacent intercoſtal and diaphragmatic veſſels, as it paſſes down through the œſophagus, and that when it is arrived into the ſtomach, it may by its coldneſs do great miſchief to the liver, which is

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incumbent on the ſtomach with the vena cava, and venous ſinus, which are ſo near, ſince our blood immediately congeals from being put into cold water, the reaſon is ſufficiently evident why cold drink is to be condemned as ſo pernicious. For if the cold air being ſuddenly admitted, ſo much injures the body when heated, that Sydenham thence [l] judges more have periſhed than by the ſword or plague, what dangers may we not fear, when cold drink is immediately applied to the internal parts greatly heated in a fever; but as air grows hot ſo much ſooner than water, and yet often tends to introduce an inflammatory thickneſs in the blood, by its coolneſs in acute fevers, much more readily will the blood be congealed by the ſudden cold of watery drinks. The moſt fatal pleuriſies peripneumonies and ſudden death, have often followed, when people being much heated, have drank liberally of cold liquors, as we are aſſured from the numerous obſervations in the hiſtory of phyſic. Nor yet can it be denied here, that the drinking of cold water has been ſometimes very ſerviceable in febrile patients. For thus upon another occaſion in the comment to § 11. it was obſerved, that Galen had frequently ſeen more than a few immediately freed from an ardent fever, with which they were afflicted by the drinking of cold liquors; but Galen adds, that this happened when the humours were moderately concocted, and therefore at a time when the violence of the diſeaſe was going off. But Celſus [m] adviſes a great quantity of cold water to be given even in the greateſt increaſe of an ardent fever, *bibat etiam ultra ſatietatem, &, cum jam venter & præcordia ultra modum repleta, ſatiſque refrigerata*

[l] Sect. VI. cap. 1. pag. 325. [m] Lib. III. cap. 7. pag. 135.

refrigerata ſunt, vomere debet. Quidam ne vomitum quidem exigunt, ſed ipſa aqua frigida, tantum ad ſatietatem data, pro medicamento utuntur. "So "as to let the patient drink beyond a moderate fulneſs, and when the belly and precordia are thus "over filled, and ſufficiently cooled, the patient "ought to vomit. But ſome do not inſiſt upon a "vomit, but only give cold water itſelf, till the "ſtomach is full, and uſe it as a medicine. But "ſoon after he adviſes only to make uſe of this "remedy:" *In quibus præter ardorem nulli dolores, nullus præcordiorum tumor; nihil prohibens, vel in pulmone, vel in faucibus*, &c. "In thoſe who have no "pains more than an ardent heat, or any tumour "of the præcordia, and without any obſtruction "either in the lungs or fauces, *&c.*" Thus Schelhammer [n] ſays, that he had ſeen a ſervant afflicted with an ardent fever, with the moſt intenſe heat, who being not well looked after, greedily drank above ten pounds of cold water, and by that means did what no phyſician could eaſily effect; namely, ſo far extinguiſhed the fever, that he was perfectly well the next morning. He even teſtifies, that he had heard from the celebrated Meibomius, that the greateſt part of the inhabitants of a whole town, being afflicted with an acute fever, and deſtitute both of phyſician and medicines, extinguiſhed the febrile heat by drinking cold water, and ſoon after raiſing the oppreſſed native heat which remained by vinous ſpirits, by which means they all recovered. But it ſometimes happens in continual fevers, eſpecially thoſe which are called putrid, that the blood tends to a putrid diſſolution, and therefore there is leſs reaſon to be afraid of coagulating the blood; and perhaps

[n] De genuina Febres curandi Methodo, Parte 3. Sect. III. § 36, 37. pag. 186, 187.

perhaps in ſuch a caſe, the drinking of cold liquors would not be ſo injurious. Moreover, in the commentaries to § 599, it was obſerved from Sydenham, that ſometimes a greater compliance ought to be made with the patient's deſires in the cure of diſeaſes, than is conſiſtent with the more fallacious and doubtful rules of art. And therefore if the patient ſometimes ſtrongly deſires cold drink in fevers, having an averſion to every thing elſe, it ſeems not at all unreaſonable to comply with it; but it can never be amiſs, rather to give it in ſmall quantities at a time, and repeated often, inſtead of drinking great draughts at once, becauſe the patient's deſires will be ſatisfied, and in the mean time many bad accidents prevented, which might be reaſonably feared. But as all that has been ſaid before, only proves that drinking of cold liquors in fevers has been ſometimes uſeful, and that more eſpecially when the patient has deſired them with the ſtrongeſt appetite, it is ſufficiently evident, that we cannot reaſonably conclude from theſe extraordinary caſes, that cold drink ought to be adminiſtered to febrile patients; no more than one can recommend ſalted herrings, bacon, and the like, in the diet of febrile patients, becauſe ſometimes fevers have been cured by the taking of theſe, contrary to the advice of the phyſician, when the patient has had a very great deſire for them. But from what has been ſaid, it is evident that warm drink, or at leaſt ſuch as is not cold, may be the moſt ſafely adminiſtered to allay thirſt in fevers.

It is moreover highly neceſſary for the drinks to be taken in a ſmall quantity at a time, as ſoon as made warm. For when thirſty patients indulge themſelves by drinking too much at once, the ſtomach is often ſo far diſtended, that its orifices

being contracted with a convulſive force, deny all paſſage to the ingeſted drink, whence great anguiſh, and many more bad ſymptoms follow, (ſee § 586. N°. 1.) Frequently alſo ſickneſs and vomiting enſue, whereby all the ingeſted liquor is thrown up again. But moreover, as an imperviouſneſs of the blood is often the cauſe of thirſt, diluent drink taken frequently, and in ſmall quantities at a time, mixes with the blood in the veins, and is as it were ground and ſhook together with it; and by that means all the impervious particles are extremely well divided. But when there is a great quantity of water poured into the veins, and mixed with the blood at once, it will not be ſo eaſily, nor ſo uniformly diluted, but ſoon after the whole quantity is expelled again from the body, either by urine or ſweats, before it is capable of an intimate mixture with the blood, by the action of the veſſels.

Various forms may be ſeen in the Materia Medica of our author, adapted to this number of the preſent aphoriſm, according to which, moſt agreeable drinks may be compoſed for allaying thirſt in fevers.

2.] This admonition is of the greateſt moment in the cure of fevers. For then the thirſt often proceeds from dryneſs and an imperviouſneſs of the blood; and then there is the greateſt danger from ſuch a diſpoſition of the blood to be feared in the veſſels of the encephalon and lungs. When therefore the patient contains ſuch warm drinks in his mouth, they waſh clean the fauces, moiſten theſe dry parts, and relax the lungs with a warm vapour; more eſpecially if the vapours of hot water are drawn through the noſe. But alſo, at the ſame time, the external branches of the carotid artery diſtributed through theſe parts, are thus re-

laxed, and by that means the impulſe and preſſure of the blood is turned off from the internal parts of the head. Add to this, that the continual moiſtening of theſe parts, moſt happily allays the thirſt. Hence Celſus orders the patient to waſh his mouth, to prevent the torture of too great thirſt, even though he adviſes abſtinence from drink in fevers (as we ſaid before at § 638). For the thirſt will continue if the tongue and internal parts of the mouth remain dry, though the patient drinks ever ſo much; and at the ſame time, by fomenting theſe parts, the bibulous veins will be relaxed, ſo as to be able to draw in the liquors applied, and the exhaling arteries will be diſpoſed to tranſmit their moſt thin vapours, with which all thoſe parts are naturally moiſtened. In dropſical patients, the troubleſome thirſt is uſually beſt allayed by frequently waſhing the mouth with water, and a ſixth part of vinegar, or juice of citrons.

3.] Namely, that theſe parts may be fomented, and the viſcera there placed ſo diſpoſed, as to give the humours a very eaſy paſſage through the veſſels; for from dryneſs and an impervioufneſs of the blood may follow many diſorders in theſe parts. But thus alſo, much liquor may be abſorbed by the bibulous veins of the external ſkin, by which the thirſt will be leſſened. But how much warm bathing will conduce to allay thirſt, has been ſaid before upon another occaſion in the comment to § 333. For Galen, in order to prove that the whole body is perſpirable, ſays it appears by experiments, that people who have travelled in the ſcorching ſun, have their mouth very dry, and are tortured with the moſt troubleſome thirſt; but upon going into the warm bath, they inſtantly perceive relief; for the mouth becomes moiſt, and the body, which was before

rough and dry, becomes ſoft and moiſt, and all the thirſt has been thus extinguiſhed. But when fomentations, epithems, or cataplaſms prepared of the like materials, have been retained to the hypochondria, and at the ſame time care is taken not to let them grow cold; in that caſe all thoſe parts are kept in a warm bath, and the ſame effects may be expected.

4. Clyſters may be uſeful here two ways, either by waſhing out the putrid excrements, which being lodged in thoſe parts, may be the cauſe of thirſt (as was ſaid before at § 636.) or elſe clyſters are ſometimes injected, with a view of their being retained and abſorbed by the bibulous veins of the inteſtines; and by that means they conſpire by their effects with the other remedies; concerning which, we have been ſpeaking under the preſent aphoriſm. But what is to be obſerved in the uſe of ſuch clyſters, has been ſaid before in the comment to § 634. where we treated of their efficacy in the cure of febrile anguiſh.

SECT. DCXLI.

BUT if the intenſe thirſt is alſo accompanied with great weakneſs, then may rich wines, and often ſpirits, be ſafely mixed and adminiſtered with the former, (§ 640.)

All the remedies mentioned in the preceding aphoriſm, mix a great quantity of water with the blood; but if now great weakneſs attends, the ingeſted liquors cannot be propelled by a due force through the veſſels of the body; whence the weak perſon will be overloaded and oppreſſed with great anguiſh, while the maſs of fluids to be moved,

ed, is ſo much increaſed by theſe liquors; otherwiſe the ingeſted water will be collected in the larger and ſmaller cavities of the body, ſo as to cauſe a dropſy; nor yet will the thirſt be allayed here, ſince all the ingeſted water will thus again eſcape from the veſſels. The beſt method of all in this caſe, is to add ſuch a quantity of wine to the watery drink, as will ſuffice to renew the powers, and not in the mean time prove injurious by too great a ſtimulus. Why the wine may be ſafely given to patients diluted with water, we have already ſeen in the comment to § 605. N°. 2. and in this caſe a greater quantity of wine may be uſed on account of the weakneſs. Even ſpirits themſelves, ſuch as the ſpirits of wine, or the compound aromatic ſpirits of the ſhops will not be here offenſive, if they are mixed with watery drinks; and it is obſervable, that thirſt is then better allayed by theſe, than by the uſe of watery drinks only. In thoſe dropſical patients who are thirſty, great relief is perceived from ſuch additions; and even laborious people who are thirſty from their hard work, uſually take a ſmall quantity of ſpirit of wine, and then they obſerve that their thirſt is much more eaſily allayed by common drink; for the ſweats with which they are then ſo much diſſolved, are moderated by theſe ſpirits, and by that means the ingeſted liquor is prevented from flowing out again immediately through the body. Forms of the like drinks, which may ſerve for theſe purpoſes, may be ſeen in the Materia Medica, at the number correſponding to that of the preſent aphoriſm.

SECT.

Of Loathings in Fevers.

SECT. DCXLII.

A NAUSEA, loathing, or a ſickneſs at ſtomach, ſignifies an endeavour to vomit without effect, with horror, a ſenſe of dread or trembling; it has therefore for its proximate cauſe a ſlight convulſion in the fauces, œſophagus, ſtomach, inteſtines, and muſcles of the abdomen; which convulſion is raiſed, 1. from a putrid, bilious, acrid, propelled, into the cavity of the ſtomach, and aſcending into the fauces, and by vellicating or irritating both, the reſt of theſe motions follow; and this is known from previous abſtinence, and a ſtinking breath, with a foul mouth, tongue and fauces; or, 2. it ariſes from a thick, viſcid, fluctuating, matter, vellicating thoſe parts where it ſwims, and is known, from the ſigns of glutinoſity preceding (§ 169. to 75.) or 3. from a ſlight inflammation in the ſtomach, œſophagus, inteſtines or adjacent viſcera, which is known from the ſigns proper to inflammation in each of theſe parts; 4. from the remembrance of a thing which being formerly taken, occaſioned a like ſickneſs and averſion; 5. and laſtly, it may be from an irregular motion of the nervous fluid, from whatever cauſe excited, which is known by a delirium, vertigo, convulſion, giddineſs and trembling.

Thoſe

Thoſe were ſaid primarily to have a nauſea who were ſick at ſtomach, either in a ſhip or in ſailing; but afterwards it was cuſtomary to apply the word to others thus affected from different cauſes [o], *Nauſeare dicti ſunt primum, quibus in navi ac inter navigandum ſtomachus langueret: deinde conſuetudo obtinuit, ut vox ea quocumque modo ſic affectis tribueretur*, and for this reaſon it ſeems to have been called ναυτία & ναυσία, by the Greeks. But the diſorder conſiſts in a fruitleſs endeavour to vomit. For thoſe are ſaid to labour under a nauſea by Galen [p], who have a vellication or uneaſineſs only, without any diſcharge of humours. Hence Seneca being in a ſhip toſſed by the waves, and himſelf not accuſtomed to theſe diſturbances ſays, "This "dull nauſea has tortured me, without making "any diſcharge; which therefore moves the bile, "but does not expel it [q]". *Nauſea enim me, ſegnis hæc, & ſine exitu torquebat: quæ bilem movet, nec effundit.* Indeed vomiting frequently follows after a nauſea, and is almoſt commonly preceded by a nauſea in ſome degree; but yet properly ſpeaking a perſon is ſaid to have a nauſea, who perceives a fruitleſs inclination to vomit without any diſcharge following. But this endeavour to vomit is always accompanied with a ſenſe of horror or trembling, and while any one has a nauſea, they have an averſion to all food and drink. If any one who is hungry unwarily ſwallows a ſmall quantity of the putrid marrow of a bone, the rotten liver of a fiſh, or corrupted fleſh, he will inſtantly have a nauſea and a trembling throughout his whole body, till the corrupted matter is either diſcharged by vomiting, corrected by the taking in of acid liquors, or elſe waſhed out of the body by diluent drink.

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[o] Plutarch. Sympoſiac. Lib. VI. Quæſt. 8. pag. 694.
[p] De Locis Affectis Lib. I. cap. Charter. Tom. VII. pag. 391.
[q] Senec. Epiſt. 53. pag. 472.

A nauſea then ſeems to differ from a vomiting only in degree, and therefore all the cauſes which produce loathing, may alſo produce vomiting if they are increaſed; and on the contrary all the cauſes of vomiting in a leſs degree, will leave behind a nauſea, as their effect. Since therefore vomiting (as we ſhall declare hereafter § 652.) is a violent expulſion chiefly of what is contained in the ſtomach by a convulſion of the muſcular fibres in the fauces, œſophagus, ſtomach, &c. therefore the ſame ſeems to take place, but in a leſs degree, in a nauſea; and therefore the immediate cauſe of a nauſea will be a ſlighter convulſion of theſe parts, which may indeed excite an irritation to vomiting, but without being able to effect that forcible expulſion of what is contained in the ſtomach, which we obſerve in vomiting. If the moſt healthy perſon introduces a finger into his fauces, ſo as to touch the root of the tongue, the moveable part of the palate, or beginning of the pharynx, he will ſoon after have a nauſea or inclination to vomit; and if at the ſame time he applies one hand to the abdomen, he will perceive the abdominal muſcles then begin to contract, only from the mechanical irritation of theſe parts. It now remains therefore to ſee what are the remote cauſes which may be able to excite this very ſlight convulſion of theſe parts, as the proximate cauſe of a nauſea: And theſe cauſes we may commodiouſly divide into five diſtinct claſſes, concerning each of which we ſhall treat ſeparately.

1.] This is a very frequent cauſe of reaching or ſickneſs at ſtomach; for the liver, which is a viſcus of ſo great a bulk, ſeparates a great quantity of humours by its fabric, from the blood which is brought into it, and thoſe humours it diſcharges by an excretory duct, into the duodenum. But when the ſtomach is empty, the pylorus is open,

open, and therefore the humours collected in the duodenum from the pancreas, liver, and gall-bladder, may regurgitate through the relaxed pylorus in the ſtomach, only by the preſſure of theſe parts in reſpiration, and this more eaſily than they can paſs along through the inteſtinum jejunum, which is cloſed with ſo many folds or wrinkles. Hence therefore a great quantity of ſuch a humour is collected in the ſtomach of a healthy perſon. After long faſting there is often belched up wind, eſpecially upon bending the body forward. But at ſuch a time there is always found a humour frothy, brackiſh, and a little inclined to bitterneſs in a healthy perſon. If now the bile becomes more than uſually acrid, or is conveyed in a greater quantity into the ſtomach, ſuch an irritation may thence ariſe, as will be ſufficient to produce a nauſea; as alſo if ſuch a humour contained in the ſtomach regurgitates into the fauces. But ſince the bile naturally inclines to putrefaction, and as the air has a free acceſs to the bile and other thin humours in the ſtomach, with which the internal heat of the body alſo conſpires, it is very evident that a putrefaction in the ſtomach ought to be feared from theſe cauſes in a little time. This ſeems to be the principal reaſon why thoſe who have faſted too long loſe their appetite, and have a ſickneſs at ſtomach. But when by too long a ſtagnation the cyſtic bile, already in ſome meaſure putrid, or exalted and corrupted by the febrile heat, is conveyed into the ſtomach, it is evident enough that it muſt increaſe all theſe diſorders. But in the mean time it is not neceſſary for a great quantity of corrupt bile to be lodged in theſe parts, to excite a troubleſome and continual nauſea. Hence *Sydenham* wonders (as we obſerved before at § 634.) that upon examining the matter diſcharged after giving a vomit, he found it neither conſidera-

ble in bulk, nor endowed with any ſenſible ill quality: And yet that the fruitleſs inclination to vomit proceeded from thence, was evident enough, becauſe after giving the vomit the nauſea was allayed. But we know that ſuch a cauſe of loathing is preſent in the body from faſting; becauſe as ſoon as any thing putrid is lodged in the ſtomach, it immediately deſtroys all the appetite. I am even apt to believe that I have ſometimes obſerved ſickneſs and loſs of appetite ariſe only from a greater quantity of good bile flowing into the ſtomach, when I ordered the abdomen of a faſting perſon to be rubbed in bed with warm woollen cloaths impregnated with the fumes of burning amber. For upon rubbing very hard he began to have a nauſea and giddineſs, with an averſion to all food, till after a few hours he had a vomiting of bile, differing neither in colour nor in any other quality from healthy bile. But when afterwards he was more cautious not to preſs that region of the abdomen in rubbing, where the bottom of the gall-bladder projects out below the edge of the liver, he perceived no diſorder from it.

But if this bilious matter lodged in the ſtomach begins to degenerate to a malignant putrefaction, there is then a putrid vapour and bitterneſs in the mouth; whence *Hippocrates*[r] reckons a loathing of food, and a bitterneſs of the mouth among the ſigns, denoting there is a neceſſity for purging upward by vomit. But it ſeldom happens that any corrupt bilious humour lies a long time in the ſtomach, but the internal parts of the mouths and fauces, and more eſpecially the back of the tongue become foul (as was ſaid upon another occaſion in the comment to § 85. where we treated on the effects of a ſpontaneous alcaly in the firſt paſſages.)

2.

[r] Aphor. 17. Sect. IV. Charter. Tom. IX. pag. 142.

2.] The firſt paſſages are by a law of nature lined with a mucus from the mouth to the anus, which not only gives a lubricity to the internal ſurface of theſe parts, but likewiſe defends them from being eaſily injured by the rough bodies ſwallowed, or acrid ſubſtances taken into the ſtomach. The mucus having ſerved theſe uſes is by degrees ſcoured off and attenuated more eſpecially by the ſaponaceous bile, 'till at length it is diſcharged together with the fæces by ſtool. But when this mucus is tougher than uſual, or the bile weaker and ſmaller in quantity, it is by degrees accumulated, oppreſſes the ſtomach, and excites an irritation, whence proceeds a troubleſome nauſea, which is often of long continuance. This diſorder is very familiar with men of letters, eſpecially thoſe advanced in years; for as theſe lead too much a ſedentary life, the abdominal viſcera are leſs agitated by reſpiration; the bile becomes inactive, and is often ſo much inſpiſſated as to be ſcarcely able to paſs out thro' the narrow neck of the gall-bladder wherein it is confined; and at the ſame time alſo old people are (cæteris paribus) more inclined to mucus than young people. In many people alſo the internal ſurface of the firſt paſſages is diſpoſed almoſt in the ſame manner as we obſerve in thoſe who have catarrhs, diſcharging alſo a great quantity of mucus every day by blowing from the noſe, by ſpitting from the mouth, and by coughing from the lungs: And hence frequently there is a very great quantity of mucus collected in the firſt paſſages. The ſame thing may likewiſe happen from the eating food which is too glutinous or viſcid, eſpecially if the ſtomach is very weak at the ſame time, and the bile more unactive. But now whether this mucus adheres to the fauces or œſophagus, or fluctuates in the ſtomach, it will have nearly the ſame effect

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as if a feather was moved in thoſe parts exciting a continual irritation, whence a perpetual nauſea ariſes ſo long as the mucus continues in theſe parts. It is likewiſe probable that the ſame effect will follow if too great a quantity of the mucus adheres to the inteſtines, eſpecially the upper or ſmaller inteſtines; for we ſee that the inteſtines being irritated by wounds, inflammations, or ſtrangulation in ruptures, excite a nauſea and vomiting. The like nauſea is likewiſe obſerved from worms creeping in theſe parts, only from a mechanical irritation of them. But ſuch a nauſea is diſcovered by thoſe cauſes preceding, from whence we are aſſured that mucus may be accumulated in the firſt paſſages; and likewiſe from obſerving thoſe effects in the body which uſually happen from ſuch a viſcid tough matter: concerning all which we treated in the aphoriſms here cited (in the text) under the title of diſeaſes ariſing from a ſpontaneous glutinoſity. It is alſo evident that this diſorder is perfectly oppoſite to that concerning which we treated under the preceding number of the preſent aphoriſm; for a nauſea produced by a tough mucus is often happily cured by bitters and billious medicines, as wormwood, centory, *&c.* and even the bile itſelf taken from healthy animals is very ſucceſsful in the like caſe; whereas, all thoſe medicines would rather increaſe the nauſea, if it proceeded from a too acrid or putrid bile.

3.] If an inſipid mucus can thus irritate theſe parts by its fluctuation as to excite an incipient convulſion and nauſea, and ſometimes even vomiting itſelf, much more ought the ſame to be expected from that irritation of theſe parts, which ariſes from a ſlight inflammation: And the truth of this is alſo confirmed by practical obſervations, as will be made evident hereafter when we come to treat of inflammatory

inflammatory diſeaſes in theſe parts. But perhaps likewiſe theſe parts, being irritated by inflammation, may alſo have a greater quantity of mucus ſeparated into them; for thus we ſee that when an inflammatory tumor invades the fauces, there is an incredible quantity of mucus collected in theſe parts, and continually diſcharged by the mouth. Add to this, that the adjacent viſcera likewiſe, more eſpecially thoſe which lie upon the ſtomach, being ſlightly inflamed, may excite ſuch a nauſea, more eſpecially if the ſtomach is compreſſed by a tumor of the parts of thoſe viſcera. *Galen*[s] treating of an inflammation of the liver, obſerves that the diſorder is accompanied with a loſs of appetite, nauſea and vomiting; and adds, that all thoſe ſymptoms accompany this diſorder in a greater degree when the concave part of the liver is inflamed, rather than when it is ſeated in its gibbous part. But it is evident enough that for the ſame reaſon a nauſea may ariſe from an inflammation in the pancreas, ſpleen, *&c.* But the ſigns which denote that this cauſe of a nauſea attends, are to be derived from the hiſtory of thoſe diſeaſes which proceed from an inflammation in theſe viſcera; concerning which we ſhall treat hereafter under the head of acute, febrile diſeaſes.

4.] This may indeed ſeem very ſtrange, though it is in the mean time very true, that a nauſea may ariſe only from a change in the thoughts or ideas. It was obſerved upon another occaſion (ſee the comment to § 104.) that the mind has this wonderful property, that it can affix ideas to certain arbitrary ſigns, though there is no manner of ſimilitude betwixt the ſigns and ideas themſelves: As when, for example, a few letters conjoined to-

[s] De Locis Affectis Lib. V. cap. 7. Charter. Tom. VII. pag. 496.

gether excite ideas in us which we entertained a great while before, and of which there was not the leaſt footſtep often left in the memory. The ſame thing likewiſe takes place in the paſſions of the mind, which are frequently renewed, from the like cauſes, even againſt our inclinations. This is alſo true of a nauſea; for I well remember that after taking a decoction of the leaves of ſenna with tamarinds for ſeveral days to cure myſelf of a violent ophthalmia, by exciting an artificial diarrhæa, I had afterwards ſuch a diſlike to this kind of medicine, that I could not even preſcribe it to others, for a long time, without exciting a nauſea and trembling throughout every part of myſelf. When a few years ago I was going to a village near the city, being perfectly in health, and having a good appetite, by ill fortune the diſtended abdomen of a great maſtiff dog, ſuffocated in the water, burſt open, and ſuddenly exhaled ſuch an intolerable vapour as immediately deſtroyed all my appetite, and raiſed a very bad kind of nauſea: But ſome time after when I have paſſed by the ſame place, without thinking any thing of the matter, the remembrance of this intolerable fœtid vapour has ſuddenly returned into my mind; but never without a nauſea and trembling, though in a leſs degree. I believe every one muſt ſometime or another have experienced how eaſily a nauſea may be raiſed only from the remembrance of a thing which before excited ſuch a diſturbance.

5.] A nauſea frequently ariſes from this cauſe alone in hyſterical women, and in men who have the ſame weak nervous ſyſtem, eaſily ſuſceptible of irritation, and ſometimes even in thoſe who have a more firm texture of the whole body. Thus even robuſt people cannot long ſupport the toſſing of a ſhip in the ſea, if they have not been accuſtomed

accuſtomed to it without being troubled with a vertigo or giddineſs, and ſoon after with a nauſea and vomiting. Many are ſubject to the like accident, if they are carried in a coach with their back towards the horſes, as alſo from a ſwift turning round of the body in a circle. *Sydenham* has remarked, that in whatever part of the body this inordinate or tumultuous courſe of the ſpirits takes place, there immediately follow ſuch ſymptoms as are conformable to the part itſelf. No wonder therefore if the violence of the diſorder fixing in the ſtomach and inteſtines ſhould excite a nauſea, and many other ſymptoms peculiar to theſe parts. There is moreover, a wonderful conſent betwixt the ſtomach and encephalon, inſomuch that the one being diſturbed eaſily produces a nauſea and vomiting in the other, as was made evident in the hiſtory of wounds in the head. From the ſame principle likewiſe a nauſea ſeems frequently to ariſe when people are diſturbed with violent paſſions of the mind. Nor does it matter from whatever cauſe this diſturbance in the motion of the ſpirits be originally produced; for a nauſea frequently enſues from an irritation of the nerves in parts of the body very diſtant from the ſtomach. *Helmontius* [t] *emturus villam obambulabat inſigni cum appetitu; tum fortuito diſtorſit pedem, lapſus eſt, rigor ſtatim obvenit, cum nauſea, vomitu, & ſuffocato edendi priore appetitu: mox vero diſtortum pedem & ſemidiſlocatum repoſuit: atque eodem inſtanti redditus eſt ipſi appetitus priſtinus, ceſſataque eſt nauſea.* "Helmont being about to purchaſe a country ſeat, "walked on with a great appetite; but happening to ſlip, he accidently diſtorted his foot, "which was immediately followed with a ſhivering, nauſea, and vomiting, with a ſuppreſſion

[t] In Capitulo *Pylorus Rector* N°. 20. pag. 184.

" of the appetite which he before had to food:
" But ſoon after he had replaced this diſtorted and
" ſubluxated foot, his former appetite returned that
" very inſtant, and the nauſea went off." This cauſe of nauſea is known to take place, if the ſigns denote that the nerves are irritated in any part of the body by a wound, diſtraction, &c. as alſo if the known habit of the patient is ſuch, that the whole nervous ſyſtem is too eaſily irritable, from whence diſturbances of the ſpirits may eaſily follow, together with all the bad ſymptoms which proceed from thence. A plentiful diſcharge of a very limpid urine attending in this caſe, is a moſt certain ſign of an hyſterical or hypochondriacal fit, as we ſaid before in the comment to § 639. Whence there is no doubt remains that the nauſea preſent in ſuch a patient proceeds from an inordinate motion of the nervous fluid. This is more eſpecially evident if a delirium, convulſion, giddineſs, or trembling, denote that the functions of that viſcus from whence all the nerves proceed, namely the brain, are diſturbed. But it ought to be more eſpecially obſerved in this place, that it appears from the moſt certain obſervations that ſordes or foul humours, whether exiſting in the ſtomach or adjacent viſcera before the fever, or formed and collected there during the time of the fever itſelf, may wonderfully diſturb all the functions of the brain, and often excite a delirium, vertigo, &c. And therefore although theſe ſymptoms denote that the brain is affected, yet frequently the cauſe of all the diſorders is not in the brain but in the ſtomach, and in that caſe the method of cure adapted to allay the inordinate motion of the nervous ſpirits will not ſuffice, but an evacuation will be neceſſary of the foul humours lodged in the ſtomach by a vomit or a purge. See what has been ſaid in the

comment

comment to § 229. concerning the wonderful efficacy of certain poiſons which greatly diſturb all the functions of the brain, as long as they continue in the ſtomach. But we ſhall ſtill have ſomething more to ſay upon this head hereafter, when we come to treat of a delirium in fevers.

SECT. DCXLIII.

IF this ſymptom continues long, it occaſions a loſs of appetite, an averſion to drink and medicines, and at length a vomiting, with the numerous diſorders that may follow from thence; of which the chief are weakneſs, a putrid or alcaline acrimony, and dryneſs.

After having explained what a nauſea is, and what different cauſes may produce it, we proceed to the conſideration of thoſe effects which are to be feared from a nauſea, if it continues for any conſiderable time; for a ſlight nauſea of a ſhort duration is eaſily tolerable, and can do no great miſchief. But all the diſorders proceeding from a long-continued nauſea ariſe from hence, namely, becauſe the body cannot be recruited with food or drink, as long as the nauſea continues; for at that time the patient always abhors every thing; and for the ſame reaſon no medicines at all can be taken. But in a healthy perſon great weakneſs will enſue, unleſs by food and drink taken in, and changed by the powers of the veſſels and viſcera, thoſe parts are reſtored which are daily deſtroyed by the continual actions of life and health; and beſides this all our humours, after abſtinence for the ſpace of twenty hours from food or drink, being left to

themſelves, by reſt and heat, or even by a violent motion, incline to putrefaction, as we demonſtrated before in treating of diſeaſes ariſing from a ſpontaneous alcaly at § 80. It is therefore evident, that a putrid alcaline acrimony will ariſe, if the nauſea continues any long time. But ſince there is a continual waſte of the moſt fluid parts of our humours by inſenſible perſpiration and other excretions, while in the mean time that which is loſt is not reſtored by drink, the body will be dried up. But it is very evident that all theſe diſorders will be encreaſed if a fever accompanies the nauſea, ſince by a fever itſelf the moſt fluid parts of the humours are expreſſed, and what remain are incraſſated (ſee § 587.) This febrile ſymptom ought for this reaſon never to be ſlighted, but to be immediately relieved. But in what manner it ought to be treated will be explained in the following aphoriſm.

SECT. DCXLIV.

THE nauſea ariſing from the firſt of theſe cauſes (§ 632 N° 1.) is allayed by the uſe of acids, ſaline and watery drinks, with food and medicines of the ſame kind; as alſo by adminiſtering a lenient purge of the ſame nature, and ſtrengthening the fibres by acid, auſtere corroborants; or, if it does not yield to theſe, by giving a vomit. But that which ariſes from the ſecond cauſe (§ 632. N° 2.) is removed by diluting, attenuating, or exciting a purging or vomiting. But if it derives its origin from the third cauſe (§ 642. N° 3.) then it will not yield till

till thoſe diſorders are cured, according to the directions which will be hereafter given in theſe caſes. The fourth ſpecies of loathing is removed by avoiding the remembrance and approach of ſuch objects. But the fifth kind is cured by reſt, with auſtere narcotic medicines and cold water.

Since it is evident from what was ſaid at § 642. that a nauſea may ariſe from ſo many different cauſes, it is eaſily apparent that no general method of cure can be preſcribed agreeable to all the kinds of loathing; but that one ought carefully to diſcover, by the ſigns there mentioned, from what cauſe the nauſea derives it origin; and then the cauſe being thus known, a juſt method of cure may be proſecuted.

1. When therefore the loathing proceeds from a ſharp, putrid, bilious humour propelled into the ſtomach, it cannot be removed, unleſs the bilious matter there lodged be evacuated, or at leaſt ſo corrected by proper medicines that it can be no longer offenſive. It is well known that all putrefaction is prevented by acids and ſalts, and that theſe will often correct even a putrefaction already begun or formed. The beſt method therefore in ſuch a caſe is to prepare food, drink and medicines of acids, or of ſuch things as very readily, or of their own accord turn ſour by the heat of the body. Thoſe very pleaſant drinks which we recommend before (§ 640.) for febrile thirſt will be here likewiſe ſerviceable: For by theſe the bilious humour will be diluted; and ſince it has frequently a tenacity whereby it adheres to the ſtomach, it may be ſo divided and attenuated by theſe ſaponaceous remedies prepared with honey, vinegar, juice of ſummer

fruits and their syrups; jellies, or inspissated juices, &c. as to be afterwards more easily diluted and expelled, if necessary. At the same time also the incipient putrefaction of the bilious humour may be corrected by these medicines. The most agreeable foods may be prepared of oats, barley, sorrel, juice of citrons, with the addition of a moderate quantity of wine, to which add butter-milk, tart apples boiled, &c. But such food and drink may supply the place of medicines, and yet the remedies which are pleasant and well adapted to the same intention, ought not to be neglected, such as the juice of elder-berries, of currants, barberries, &c. with the addition of nitre, fossil, and acid spirits, prepared chemically from nitre, sea-salt, vitriol and sulphur, used in such a quantity as will communicate an agreeable taste to those remedies, and yet not offend the stomach in the mean time by too much acrimony. The same acid spirits being united by a long continued and repeated digestion and cohobation with alcohol of wine afford an acid oily medicine which is mild enough, and yet powerfully resists all putrefaction, and by a grateful fragrancy wonderfully recruits a weak stomach. But so agreeable are all these in this kind of loathing that the patient who abhors every thing else can nevertheless bear these, and even frequently has a very strong and spontaneous desire for them.

But at the same time such remedies will be here useful as correct the putrefaction by a mild acidity, and so irritate the first passages by a gentle stimulus, as to discharge the bilious matter by stool without any great disturbance. Here therefore cream and crystals of tartar, pulp of tamarinds, simple oxymel, &c. hold the first place; and may be either given alone, or mixed with the

preceding

preceding remedies. But ſince by a nauſea, eſpecially one of long continuance, the tone of the ſtomach is weakened, ſuch remedies will be uſeful as are auſtere, or have a roughneſs joined with their acidity, by a prudent uſe of which the ſolid parts of our body are ſo wonderfully corroborated (§. 28. N°. 4.) Hence the marmalade of quinces, the diamoron of Nicolaus as it is called in the ſhops, as is prepared from the juice of four, unripe mulberries boiled with honey, the juice of pomegranates, medlars, *&c.* with ſuch remedies as are prepared from theſe in the ſhops, are highly recommended.

But when there is ſo great a quantity of corrupt bile, or when it has acquired ſo great a malignity that it cannot be corrected by theſe means, but the nauſea increaſes by every thing that is taken, however grateful and pleaſant, nothing then remains but to diſcharge it upward, by giving a vomit. But in the mean time it can ſeldom or never be injurious to attempt the cure firſt by adminiſtering ſuch things as we before recommended, ſince the putrefaction to be feared may be reſtrained by theſe, and the bilious matter ſo far attenuated and diluted as to be expelled with leſs uneaſineſs by a vomit. I well remember when bilious fevers were epidemic after a very hot ſummer, in which there was almoſt conſtantly a troubleſome nauſea and vomiting, I ſometimes gave a vomit immediately without much relief, but when I uſed oxymel or the like for a day or two, diluted with a great quantity of water, the corrupt bile often diſcharged itſelf ſpontaneouſly by vomit, almoſt like thick glue, or elſe was eaſily expelled by giving a gentle vomit a ſecond time. But only the more gentle vomits are here uſeful, (leſt the force of the fever ſhould be

increaſed by the more violent) namely, oxymel of ſquills, root of ipecacuanha, &c. which may be ſafely given in ſmall doſes even to infants. Sydenham[u], who uſed none almoſt but antimonial vomits, confeſſes that he has been obliged to abſtain from the uſe of emeticks in young children or infants, when the curative indication called for them, becauſe he apprehended dangerous events from them in ſuch a tender age. It will be likewiſe of the greateſt uſe, if a few ounces of warm water or ſome other thin liquor are drank after each vomiting; for thus the patient will vomit with more eaſe, and all the bilious matter will be more effectually waſhed off from the ſtomach. After the operation of the vomit was ended, he gave a gentle quieting draught with diacodium, to allay the diſturbance raiſed by the medicines[w], and only by giving a vomit in this manner Sydenham aſſures us he has been able ſucceſsfully to cure the nauſea in fevers; and this method may be always ſafely proſecuted provided we are ſure no inflammation is ſeated in the adjacent viſcera, and that there is no danger of their being unable to ſuſtain the violent ſhocks made in vomiting, which would deſtroy them, if they were corrupted by a long continued cacochymy, or a latent abſceſs. For it is very evident the inflamed parts by ſo violent an agitation might be affected with a gangrene; and if there is a latent vomica for example in the liver, which uſually excites a malignant nauſea, after giving a vomit a fatal overpurging often enſues, ſince the corrupted liver being violently preſſed, may be burſt open by the diaphragm and abdominal muſcles convulſed. The celebrated Boerhaave is uſed to tell his audience upon this occaſion, that he had ſeen ſuch a caſe in a merchant of this city, Leyden, who after having

[u] Sect. I. cap. 4. pag. 68. [w] Ibidem pag. 67.

having had the ſigns of a diſeaſed liver for a conſiderable time, with a ſlow fever, and a yellow colour almoſt as in a jaundice, a gentle vomit was given him to remove the very troubleſome nauſea: this being done, a great quantity of ichorous corrupted yellow matter was evacuated both upward and downward, but without any relief, and a fatal ſuperpurgation with faintings enſued, ſo that he expired a few days after. Upon opening the dead body, almoſt the whole ſubſtance of the liver was found corrupted, and filled with a putrid ichor. But after the foul humour has been thus diſcharged by a vomit, thoſe acid, auſtere remedies lately mentioned will be highly uſeful, that by theſe means the ſtomach weakened by a long continued nauſea and vomiting may be reſtord to its due ſtrength.

2. But if the ſigns denote the nauſea to be cauſed by a tough, viſcid matter, fluctuating in the ſtomach or adjacent paſſages, this ought likewiſe to be removed. But frequently there is ſo great a tenacity in this mucus, that it cannot be eaſily waſhed off either by vomits or purges, unleſs it be firſt diluted and attenuated. Water diſſolves and dilutes all ſorts of mucus in the body, and even the very tough mucus of the noſe hardened into ſcales may be diſſolved only by maceration in warm water. But in ſuch people as have this redundant flux of mucus, there is always a weakneſs of the ſtomach, and the flaccidity of the body will hardly with ſafety permit a great quantity of diluent warm water; and therefore we endeavour to diſſolve firſt this tough glutinous matter, and at the ſame time to amend the weak and cold diſpoſition of the ſtomach in ſuch people, by adminiſtering venice ſoap, the inſpiſſated bile of healthy animals, alcaline ſalts themſelves, bitter,

bilious,

bilious, and aromatic medicines, ſuch as wormwood, the leſſer centaury, the roots of gentian or elicampane, &c. But when this is done, the mucous matter may be eaſily expelled by a vomit or purge, after it has been once diſſolved and rendered moveable. But for this purpoſe is to be preferred, before the other medicines, the oxymel of ſquills, a medicine of the greateſt fame with the ancient phyſicians, and which by the very penetrating bitterneſs of the ſquills fuſes and divides all phlegm, and then evacuates it by exciting a vomit, provided it be taken in a larger doſe than as an alterative. There are alſo other vomits and purges which may ſerve for this purpoſe, ſeveral forms of which are enumerated in the Materia Medica at the number correſponding to that of the preſent aphoriſm. For there is ſeldom any danger to be feared from evacuating medicines in this kind of nauſea. But when ſuch a mucous cacochymy has infected the whole maſs of blood, it ſometimes happens that the like viſcid matter begins to be accumulated by degrees in the ventricles of the brain, whence the patient grows ſtupid, dull, forgetful, ſleepy, lethargic, and at length falls into an apoplexy. But in this caſe the uſe of vomits may be often of dangerous conſequence; for during the time of a perſon's vomiting we ſee that all the humours are carried with a greater impetus and velocity towards the head, whence the face ſwells, the eyes look red and water, and a giddineſs with a noiſe in the ears are often perceived. When therefore the encephalon begins to be overloaded with a tough viſcid cacochymy, to urge the humours upon this part with a great force by a vomit, may occaſion a fatal apoplexy; and therefore it will be ſafer in this caſe to make an evacuation of the viſcid matter by purges.

3. It

3. It ought always to be enquired, with the ſtricteſt attention of mind, whether the nauſea appears (from the nature of the epidemical diſeaſe then reigning, or from the ſigns to be obſerved in the patient) to ariſe from an Inflammation in the ſtomach or adjacent viſcera. For a pain in theſe parts, with an acute continual fever, and a hard pulſe, give juſt reaſon to ſuſpect an inflammation: But a vomit given in ſuch a caſe, muſt without doubt do great miſchief; for by the violent concuſſions, the ſame thing happens to theſe inflamed parts, as if one was to violently rub the hand when inflamed; for the moſt intenſe pain and a gangrene might ſoon follow from thence. In this caſe then only, the general method of curing inflammation by bleeding, cooling purges, diluents, *&c.* will be convenient, making uſe of ſuch cautions at the ſame time, as may be required by the different nature of the part, and as we ſhall explain hereafter in treating of inflammatory diſeaſes in theſe viſcera. Sydenham, who followed the example of the great Hippocrates, ingenuouſly confeſſes he has been miſtaken in ſuch a caſe: For in a noble lady, of a ſanguine temperature, and in the flower of her age, he obſerved a troubleſome vomiting, together with an ardent fever, in which caſe after bleeding, he ordered an emetic to be given, as he had ſo frequently known the vomiting in theſe fevers to be cured by ſuch an evacuation; but the next day, when he was informed the patient had a flux, he ſoon perceived that the vomit had been miſchievous, though in other caſes where the nauſea proceeds from corrupt, bilious matter, it certainly prevents a conſequent diarrhæa, or removes it when preſent. He therefore now altered his method of cure, but in vain, for his patient expired about the fourteenth

day

day of the diſeaſe. Being moved by this unhappy event to enquire into all the particulars which he had obſerved in the courſe of this diſeaſe, he concluded it was a local inflammatory diſorder: For, the moſt burning heat remained even after repeated bleeding, the blood evacuated reſembled that in a pleuriſy, and there was likewiſe ſomething of a cough with obſcure pains in the vital organs; the time of the year was about midſummer, when inflammatory diſeaſes are the moſt fierce, and pleuriſies were at the ſame time epidemical. Hence therefore, he afterwards treated the ſame diſeaſe with which many others were taken as a pleuriſy; namely, by bleeding, with diluents, *&c.* which method of cure very happily ſucceeded [x]. Happy is the perſon who immediately knows how to correct the error he has committed; for to err is a part of humanity, and therefore common to all of us, but immediately to diſcover and correct the error, muſt be allowed by every one to lie in the power only of ſuch as are moſt accompliſhed.

The fourth ſpecies, *&c.*] For here no alteration is made in the ſolid or fluid parts of the body, but the nauſea ariſes merely from a change in the thoughts or ideas. Therefore only by forgetting the thing which formerly excited the nauſea, and avoiding whatever may renew the memory of it, will entirely complete the cure. For by this means the firſt impreſſion is uſually effaced, or at leaſt ſo much weakened, that little or nothing of the nauſea returns when the remembrance is renewed of the thing nauſeated, even a long time after.

But the fifth kind, *&c.*] For here only the inordinate motion of the nervous ſpirits makes the cauſe of the nauſea; which diſturbance ought

[x] Sydenham Sect. II. cap. 2. pag. 148. &c.

there-

therefore to be allayed, for which purpoſe narcotics afford of all medicines the moſt effectual relief, concerning the uſe of which, ſee what has been ſaid in the commentaries to § 104. 202. and 229. But ſince generally a nauſea ariſing from this cauſe is accompanied or preceded with a vertigo, and as vertiginous patients can hardly bear the leaſt motion of their body without increaſing their diſorder, it is evident, that reſt is more eſpecially uſeful to ſuch. Sydenham [y] obſerves, that when he endeavoured to cure enormous vomitings in hyſterical women, it was his cuſtom to give narcotics chiefly in a ſolid form, or elſe diluted with ſo ſmall a quantity of fluids as might juſt ſuffice as it were to line the coats of the ſtomach, without being capable of a diſcharge by vomiting. In the mean time he adviſes the patient to be immediately diſpoſed to reſt after taking the narcotic, and more eſpecially to keep their head ſtill, becauſe the leaſt motion of it, more than of any other part, excites vomiting. But to ſtrengthen the ſtomach, which in theſe patients is generally weak and too eaſily irritable, it will be convenient to give the auſtere medicines which ſo happily corroborate the too weak and lax fibres (ſee § 28. N°. 4.) to which add the drinking of cold water. For by cold we know the elementary particles of our ſolids approach mutually cloſer to each other, and increaſe their coheſion together. Moreover, every thing will be here convenient which ſerves for the cure of too great a weakneſs in the fibres, veſſels and viſcera, which we recommended before at § 28. and 47. but theſe are given not ſo much to relieve the preſent nauſea, as to corroborate the whole body, that it may not for the future be ſo eaſily affected by ſlight cauſes; and therefore a conſequent

[y] In Diſſertat. Epiſtolari, pag. 528.

quent nauſea is thus prevented. For theſe inordinate motions of the nervous fluid, are never obſerved in robuſt people daily exerciſed with labour; but are moſt familiar to tender women, and men who lead a ſedentary life.

But in this caſe, evacuations either by purging or vomiting, are almoſt conſtantly pernicious, ſince the cauſe of the diſeaſe does not conſiſt in corrupt humours, but only in a diſturbed motion of the ſpirits. But daily obſervations teach us, that hyſterical women, and hypocondriacal men, are immediately ſeized with a fit of this diſorder, if profuſe evacuations have proceeded. But in the mean time it cannot be denied, that the moſt ſurpriſing, and often the moſt ſudden changes, may ariſe only from an inordinate motion of the ſpirits. For in a perſon unaccuſtomed to the ſea, however healthy he may be on firſt entering on board, when the ſhip begins to be toſſed, a nauſea generally enſues, ſoon after which the contents of the ſtomach are vomited up, and then bile is brought up with a very troubleſome ſtraining, till at length the bile diſcharged is ſaid to be eruginous, from its deep green colour. But this bile did not pre-exiſt as ſuch in the body, but was thus altered by the unuſual diſturbance in the ſpirits from the agitation of the ſhip. In people who fall down with their head foremoſt from a high place, there is often a vomiting of eruginous bile inſtantly enſues, even though they were before moſt perfectly in health, as we ſaid before in the hiſtory of wounds of the head. Sydenham [z] indeed makes the colour of the humours ſo uncertain and eaſily variable, that he thinks he cannot from thence diſcover any thing certain of the nature of the

[z] Ibidem, pag. 499.

the bodies in which they appear; and to prove this, he alledges the experiments of the chemists, who only by mixing bodies together, know how to produce a wonderful variety of colours. Yet this seems to be true, that if the bile is so altered by an inordinate motion of the spirits, as to become eruginous, and stagnate about the præcordia, a nausea will continue as long as such bile is lodged about these parts. Thus, I have seen several who have been sadly afflicted with a nausea and vomiting from the tossings of a ship at sea, and who have continued ill after being set on shore, until the troublesome bilious matter lodged in the stomach was discharged by a gentle vomit. The same thing is also acknowledged by Sydenham [a], when he says: *Quamvis autem satis pateat, originarium hujus morbi fomitem in humoribus nullatenus stabulari, fatendum est tamen (quod res est) spirituum* ἀταξίαν *illam, cui morbus debetur, humores putridos in corpore coacervandos gignere,* "That although it is sufficiently evident that the origin "of this disease cannot be placed in the humours, "yet it must be confessed (what the truth is) "that the disturbance of the spirits to which the "disease is owing, occasions the formation and "accumulation of putrid humours in the body, "*&c.*" And therefore he begins the cure even of hysterical disorders with evacuating medicines; namely, if there are signs denoting that the viscera are oppressed with a load of fæculent humours. But when severe pains, vomiting, diarrhæa, *&c.* receive no relief from thence, he directly allayed the inordinate motions of the spirits with anodynes, and when the disturbance was over, he afterwards applied himself to the radical cure of the disease.

[a] Ibid. pag. 504.

It is therefore evident, that evacuating remedies do not cure the primary cauſe of the nauſea, concerning which we are here treating; and even that, if they are ſtrong, or often repeated, they rather do miſchief: But they ſometimes are of ſervice by evacuating the ſtagnant humours collected together by theſe diſturbances of the ſpirits; and this more eſpecially if the tumults raiſed in the body by ſuch evacuations, are afterwards allayed by the uſe of anodynes.

SECT. DCXLV.

HENCE we may underſtand, why a purge or a vomit is ſo uſeful when there is a nauſea, if given in the beginning of acute diſeaſes, and in what kind of acute diſeaſes? Why patients afflicted with acute fevers, have ſuch an abhorrence to any thing fat or oily, eggs, fiſh, *&c.* while on the contrary they have an appetite to water, acids, ſummer fruits, and cold drinks? Why Medicines are uſeleſs to the patient until the nauſea is removed? Why this ſymtom is often incurable? And why ſuch diſeaſes often go off at laſt with a ſudden, unuſual, and wonderful appetite.

From what has been already ſaid of a nauſea, the reaſon of the following particulars is evident.

Why a vomit or a purge, *&c.*] Becauſe in theſe diſeaſes very frequently a perpetual nauſea ariſes and continues from a corrupt, acrid bile, ſtagnating in the ſtomach, or adjacent parts, and

which daily acquires a worſe degree of malignity from the heat increaſed by the fever, and the free acceſs which is given to the air into theſe parts: whence a vomiting ariſes, followed with a putrid diarrhæa, which is often fatal, while in the progreſs of the diſeaſe, the patients ſtrength being exhauſted, they are no longer able to ſupport the diſcharge. Hence therefore if the putrid bilious matter is evacuated in the beginning of the diſeaſe by a vomit or purge, all theſe ill accidents will be prevented. But above all, this method is frequently uſeful in acute autumnal fevers, which are uſed to ſpread epidemically after the bile has been exalted and kindled by the ſcorching heats of the ſummer; and almoſt all of which are acute remitting fevers, conſiſting of double paroxyſms of intermittents; and frequently when the force of theſe fevers has been ſubdued, they turn themſelves over to the claſs of intermittents: But in acute inflammatory fevers, as are moſt of thoſe continual ones which appear in the beginning, or in the height of the ſummer, this method is often deceitful, becauſe the nauſea which accompanies theſe fevers, very often ariſes from an inflammation of the ſtomach, or adjacent parts; whence in ſuch a caſe vomits eſpecially make every thing worſe, as is evident from what was ſaid under the third number of the preceding aphoriſm.

Why patients afflicted with acute fevers, *&c.*] For all theſe ſubſtances of their own accord degenerate into a putrid rancidity, and ſince moſt of the functions are injured by the fever, what is taken into the ſtomach, is either difficultly, or not at all digeſted, and therefore they follow their own ſpontaneous corruption; and at the ſame time the quickneſs of the circulation being increaſed by the fever, inclines every thing to putrefaction,

(ſee § 100.) and often, as we ſaid before, the putrid bile in acute diſeaſes is protruded into the ſtomach, or lodged in the adjacent parts. Hence provident nature, who is often herſelf ſo ſufficient in the cure of diſeaſes by a ſalutary inſtinct, invites and urges the patient to deſire watery liquors, acids, garden-fruits, and every thing which can introduce an agreeable coolneſs through the body, heated by the fever. But theſe alſo allay the thirſt, and waſh out the corrupted humours lodged in the primæ viæ, correct the preſent, and prevent a conſequent putrefaction, diſſolve the concreted juices by a mild ſaponaceous force, and alſo looſen the bowels at the ſame time by a gentle ſtimulus; from whence it is ſufficiently evident, how uſeful theſe things may be in acute fevers.

Why medicines are uſeleſs to the patient, unleſs the nauſea is removed.] For as long as the nauſea continues, the patient abhors every thing, or if any thing is taken, it is thrown up by vomiting, while the nauſeating ſtomach is ſo eaſily irritated by every thing that is ſwallowed. But in fevers generally attended with a nauſea, either from acrid bile lodged in the firſt paſſages, or from an inflammation in the ſtomach and adjacent parts, it is evident enough, that the medicines taken into the body, will not ſtay to do any ſervice, unleſs the nauſea is removed. For unleſs the bilious matter lodged in theſe parts can be expelled by medicines either upward or downward, or at leaſt be ſo corrected as no longer to irritate theſe parts into ſuch convulſions as excite the nauſea, nothing can be done, but the corrupt matter there lodged will infect the afluent humours with its malignity, and increaſe the nauſea into a vomiting; by which, unleſs it is expelled, acquiring conſtantly a worſe putrefaction by ſtanding and the

heat of the body, it will excite a moſt putrid diarrhæa, or a dyſentery, which is frequently fatal when the ſtrength of the patient has been exhauſted by the diſeaſe and a long continued nauſea.

Why this ſymptom is often incurable.] Becauſe ſometimes the cauſes of the nauſea cannot be removed. For if there is ſo violent an inflammation of the ſtomach and adjacent parts, that it cannot be reſolved, the nauſea thence proceeding, will be equally inſuperable. Thus alſo, if a putrid vomica or abſceſs lies concealed in the liver corrupted, which by a continual drain of its putrid matter through the hepatic duct into the duodenum, excites a perpetual nauſea, it will never be curable, unleſs the putrid ſpring or abſceſs in the liver can be firſt cured, which yet is often impracticable. Vomits are here always dangerous, becauſe there is juſt reaſon to fear, leſt the liver waſted by an abſceſs ſhould be burſt by the force of vomiting; and although the putrid matter, lodged in the ſtomach or duodenum, ſhould be diſcharged, a quantity of the ſame matter will ſoon be collected there again; and therefore a ſtubborn nauſea will continue inflexible to all remedies, except that it may be often a little mitigated by acids, eſpecially the ſpirit of ſea ſalt, than which there is hardly found a more efficacious medicine to correct putrefaction. Such a troubleſome and often incurable nauſea is ſometimes obſerved, when the whole internal ſurface of the fauces, œſophagus, ſtomach, and inteſtines, are affected almoſt in the ſame manner, and loaded with mucus, as is the internal membrane of the noſe in a cold; and this is frequently a troubleſome diſorder to old people and men of letters. The like kind of nauſea is often obſerved, eſpecially in a morning, in thoſe accuſtomed to a daily abuſe of ſpirituous

liquors; for in theſe miſerable patients, the ſtomach is often ſo cold and weak, that unleſs they are ſtimulated by theſe ſpirits, there follows a perpetual nauſea, and vomiting of a tough phlegm, whence they are obliged even againſt their inclination to have recourſe to the ſame liquors. It is likewiſe evident from daily obſervation, that the nauſea which ariſes during the firſt ſtage of pregnancy is inflexible even to the beſt remedies, till it ſpontaneouſly leſſens, and often entirely ceaſes after the third or fourth month from the time of conception.

And why ſuch diſeaſes often go off.] We are furniſhed with numerous obſervations in the hiſtory of diſeaſes which teach, that ſometimes the patient, after being afflicted with a long continued nauſea, and an averſion to almoſt every kind of food, has on a ſudden fallen into a ſtrong appetite for ſuch things as in the opinion both of their phyſicians and friends ſeemed to be miſchievous. But in the mean time thoſe prudent phyſicians who have been moſt verſed in practice, have carefully remarked that we ought not always too rigidly to adhere to the rules of art, when the patient deſires things ſeemingly abſurd or improper, as we obſerved before upon another occaſion in the hiſtory of fevers. For theſe efforts of nature in ſubduing diſeaſes are very often wonderful, and frequently ſurpaſs all the ſkill we are poſſeſſed of in the art of healing. Sydenham has obſerved, that towards the end of a certain wandering and continual epidemic fever, thoſe patients who were about to recover were importunately urged with a deſire for ſomething improper or abſurd, either in food or drink; and he tells us he readily complied with ſuch inclinations as ſeemed inconſiſtent, becauſe the ſtrength of the body being exhauſted, called aloud

aloud for refreſhment. When the cauſes of the diſeaſe are known, and what is ſo much deſired by the patient will be ſerviceable againſt the known cauſes of the diſeaſe, they readily comply; thus they grant thin drinks, garden fruits, a cooling air, *&c.* when they are deſired by thoſe who are afflicted with acute fevers; but when towards the end of theſe diſeaſes the patient has a great deſire for pickled or red herrings, or other eatables of a difficult digeſtion, they are generally refuſed, becauſe ſuch things are believed to be repugnant to the rules of art. And yet as Sydenham obſerves [b], *In his omnibus naturæ, ut videtur, aberrationibus, quilibet in Praxi Medica vel mediocriter verſatus, modo animum diligenter adverterit, facile concedet, ægros haud paucos, ubi primum ſpreto Medici dictamine genio ſuo obſecundaverint, ſe melius habuiſſe*; "In theſe ſeemingly unreaſonable longings of nature, one who is even but moderately verſed in the practice of phyſic, if he diligently attends to the matter in hand, will readily grant, that there are more than a few patients, who have found themſelves better by ſatisfying their appetite, which was at firſt oppoſed by the advice of the phyſician [c]". But as thoſe rules of practice are the moſt certain which are derived from the juvantia and lædentia (concerning which ſee § 11. N°. 2. and § 602. N°. 7.) and as many things are at preſent and ever will be concealed from us, it ſeems therefore to be the part of a prudent phyſician, not always of a ſudden to reſiſt the unuſual appetite of a patient, but rather to comply with it, unleſs certain miſchief will infallibly enſue from the uſe of what they deſire. But in the mean time, their unuſual appetite

[b] Sect. V. cap. 2. pag. 288, 289.

[c] Idem in Diſſertat. Epiſtolar. pag. 459.

is generally towards ſuch things as are acid and ſalt, and extremely averſe to all putrefaction, and the loſs of appetite and loathing of food in women with child is the moſt frequently removed by ſuch. Thus Tulpius [d] has an obſervation, that a woman with child abhorring all food, had afterwards a ſtrong deſire for raw ſallet and turbots hardened by ſalting and dried in the ſmoke, and upon theſe only ſhe lived healthy for the ſpace of ſix whole months. Another woman with child was ſo highly delighted with ſalted herrings, that before her lying-in, ſhe eat fourteen hundred of them without any offence to her ſtomach, or injury to her health [e].

SECT. DCXLVI.

Of Belchings and Wind in Fevers.

BELCHINGS have for their cauſe an elaſtic matter, capable of dilatation, and produced by heat, efferveſcence or fermentation in the firſt paſſages; which elaſtic vapour being one inſtant confined, and the next ſet at liberty by a relaxation of the parts wherein it was impriſoned, is then exploded or diſcharged with ſome force and noiſe.

When air or an elaſtic vapour of the ſame kind is diſcharged upward by the mouth, it is termed a ructus or belching. In which we are therefore to conſider the matter expelled, and then the cauſes which confine the matter before its exploſion, and which

[d] Obſerv. Med. Lib. 2. cap. 20. pag. 130. [e] Ibid. cap. 24. pag. 135.

which afterwards discharge it with some force or noise, after being 'till then confined. For if we rightly understand these two principles, we shall have a just idea of belching and flatulency.

But the matter of belching and flatus is air, either that of the common ambient medium, with which we are encompassed on all sides, or else another kind of air resembling the former in its elasticity, and many other qualities, but which being concealed in a wonderful manner in bodies, is extricated from them by heat, effervescence or fermentation. For the celebrated *Boyle* [f] has taught us that water, wine, oil, and many other liquors, contain elastic air, which upon taking off the pressure of the incumbent atmosphere by the air-pump, ascends in the form of bubbles. The same thing has been since more perfectly considered by our celebrated author of these aphorisms [g], who by just experiments has demonstrated to his audience that elastic air, notwithstanding its particles cohere together with a certain degree of tenacity, may yet be dissolved into exceeding small particles, so as to insinuate itself spontaneously into the empty spaces of liquors which contain no air, and be equally distributed throughout the whole mass of the liquor. Indeed the quantity of air thus imbibed by liquors is very small, and it occupies an exceeding small compass in the liquor; but yet in the mean time this small portion of air being absorbed, the liquor will not receive any more air into itself, whatever artifices may be tried to induce it. Nor does each individual particle of the air thus dissolved, and separately existing in those interstices of the liquid which are received betwixt

[f] Nova experimenta physic. mechanic. Tom. I. pag. 57, &c.
[g] Vide Chemiæ Element. Tom. I. pag. 507. & seq.

betwixt the contiguous elements, ſeem to retain the phyſical qualities of air; namely, elaſticity, and a very eaſy dilatability by heat. But when from any cauſe two of theſe airial particles diſſolved in a liquor are drove out, and joined together from the interſtices of the elements or atoms of the liquid wherein they adhered, they then ſeem to repel each other forcibly, and conſtitute one of the leaſt bubbles of true elaſtic air, dilatable by the leaſt increaſe of heat. But this wonderful power whereby the ſeparate elements of the air lodged in liquors, repel each other when they become again contiguous, ſeems to conſtitute the elaſticity of the air: And this is ſo great, that the leaſt quantity of that air which was lodged in a diſſolved ſtate in a drop of water, having its air particles or elements brought together into contact by expelling them from the interſtices of the water by heat, that it produces ſuch a bulk of truly elaſtic air, as will occupy a much larger ſpace than the drop of water itſelf, wherein the elementary particles of the air before exiſted ſeparate from each other.

All theſe particulars are directly proved by experiments in our author's chemiſtry before cited, and are neceſſary to be premiſed to enable us to enquire after the manner in which the elaſtic air, which is the material cauſe of belching and flatus, is produced in our bodies, and that we may know to what principles it is chiefly owing.

SECT.

SECT. DCXLVII.

HENCE therefore the common air, ſalts of an oppoſite nature, ripe garden fruits, putrefying humours, and fermenting vegetables, afford the matter of belching and flatus, the force and ill ſmell of which varies according to the different nature of the bodies which produce it.

This matter of belching or flatus either enters the body already in an elaſtic ſtate and dilatable by heat, or elſe lying inſenſibly concealed in certain bodies, it is afterwards extricated from them. Concerning each of theſe we ſhall treat ſeparately. But a matter already elaſtic is afforded by

The air.] That air is the matter of flatus in the human body, has been long ago obſerved by Hippocrates[h], when he ſays, *Hominum enim & aliorum animantium corpora triplici alimento nutriuntur. Sunt autem illis alimentis hæc nomina: cibi, potus, ſpiritus. Verum ſpiritus, qui in corporibus ſunt, flatus vocantur; qui vero extra corpora, aër.* "The bodies of men and other animals, "are nouriſhed by a threefold aliment: but theſe "aliments are denominated meat, food, drink, "and ſpirit, or air. But the ſpirit within the "body is called flatus, as that without the body "is called air." For that the common air with which we are encompaſſed on all ſides, has a free courſe to enter into the firſt paſſages of our body, there is no one at all doubts. Moreover, as the air is mixed with the food and embarraſſed in the ſaliva with

[h] De Flatibus cap. 2. Charter. Tom. IV. pag. 214.

with the mucus of the tongue, mouth, and fauces, during the time of maſtication, it is by that means conveyed into the ſtomach, and is from thence tranſmitted through the inteſtines, performing very conſiderable uſes in the digeſtion of the aliments, ſince by its elaſticity and preſſure varying every moment by the heat of the body, it attenuates and renders the aliments fluid, excites the periſtaltic motion of the inteſtines, or elſe continues their motion once begun [i]. There is no doubt therefore remains, that the common air entring the body may conſtitute the material cauſe of belching and flatus.

But there is another queſtion remains, whether the air thus concealed in liquors, or in other bodies, ſo as no longer to retain any of the phyſical properties of common air, may ſometimes be ſo extricated from thence within our body, as to acquire that elaſticity and eaſy dilatability, when the elementary air particles are united together, which before exiſted in them aſunder. It is evident from phyſical and chemical experiments, that taking off the preſſure of the atmoſphere, or only a conſiderable weakening of it, as alſo a great heat, extricates the air diſſolved in liquors, and unites together its ſeparated elementary particles; and thus elaſtic air is again produced. But it is alſo evident from direct experiments, that the heat of an healthy body does not extricate the air, unleſs it becomes ſo great as to leſſen the preſſure of the atmoſphere, which we never obſerve naturally. Even in a living perſon, there is very rarely ſo great heat preſent, as to be able to produce the like effects. We may therefore conclude, that the air contained and diſtributed throughou

[i] H. Boerhaave Inſtitut. Medic. § 58. 64. 69.

throughout our humours, cannot naturally extricate itſelf ſo as to be collected together with the veſſels in the form of air bubbles [k], and that if this ever happens, ſudden death follows. I inflated air by a tube into the crural vein of a dog, and ſoon after a great anguiſh, difficulty of reſpiration, and death enſued. The ſame has been alſo remarked from the air impelled into the jugular veins by Harderus [l]. Ruyſch [m] found the heart of a ſurpriſing magnitude, and inflated, in the body of a woman; and upon wounding the heart with the point of a ſcalpel, it inſtantly collapſed and diſcharged the air with which it was filled, having little or no blood. But then he adds, that this woman died ſuddenly. There are many more obſervations of the like kind, teaching that air has been ſometimes found in the blood-veſſels, or in ſome other receptacles. In animals exerciſed with violent labour of body, there is ſometimes ſo great a heat raiſed as to extricate the air from the humours, and to raiſe bliſters; but then ſudden death very frequently follows this too violent exerciſe of body. In the moſt ardent fevers before death there is ſometimes ſo great a heat raiſed, that the like appearance alſo enſues. This more eſpecially happens when there is a great propenſity to putrefaction in ſuch diſeaſes, and the putrid humours diſcharge their contained air in the manner we ſhall preſently explain; and therefore it is no wonder that truly elaſtic air ſhould be ſometimes found mixed with the blood after death, ſince then every thing ſpontaneouſly inclines to putrefaction. But in the mean time it is evident from all that has been ſaid, that naturally no elaſtic air is to be found

[k] Vide de his H. Boerh. Chem. Tom. I. pag. 517, 518, 525, 526. [l] Joh. Jacob. Harderi Apiarium, pag. 114.
[m] Epiſt. Anatom. & Problem. 16. pag. 11.

found in the blood, and that when it is there by diſeaſe, the patient is in danger of ſudden death.

But chemiſtry has diſcovered many other ways whereby the latent air may be extricated from bodies, all which methods may take place in the firſt paſſages of the body, which make the proper ſeat of belchings and flatus. For when ſalts of an oppoſite nature are mixed together, or earths with acids, they raiſe a wonderful motion of effervescence, during which a great quantity of elaſtic air breaks forth, and this even though the two bodies were included a long time in a Boylean vacuum before their mixture, ſo as to free them of all the air that could be extricated from thence by removing the preſſure of the atmoſphere *. How great a quantity of air is generated by ſummer fruit, putrefying humours, and fermenting vegetables, has been demonſtrated at large by many experiments by Mr. Boyle †. It appears from daily experience, that fermenting liquors yield an incredible quantity of elaſtic air, which if it finds no vent whereby it may exhale, breaks through any veſſel with an immenſe force. But we every day feed upon ſuch things as are naturally inclined either to ferment or putrefy; and therefore when ſuch an inteſtine motion is carried on in the firſt paſſages, it is ſufficiently evident that the elaſtic air thence generated, or rather extricated, will afford the matter for belchings and flatus.

But the force or impetus of this elaſtic matter will be various, according to the different manner in which it is produced. An effervescence of alcaline ſalts with acids, make a pretty forcible exploſion of this elaſtic matter; putrefaction and fermentation diſcharge it with a leſs force, but then they continue to generate or produce it for a much longer

* H. Boerh. Chem. Tom. I. pag. 527. & ſeq. † In Experim. Phyſic. Mechanicis.

longer time. Ripe fruits plentifully eaten, generate a great quantity of this flatus, and often very suddenly by the heat of the body; and from hence follows such a sudden inflation of the stomach in many people after eating those fruits.

For the same reason likewise, the fœtid smell will be various: Namely putrid, if it proceeds from a matter inclined to putrefaction; sourish, if it proceeds from a fermenting or vinous body; and again, of a kind different from either of these if it arises from an effervescence of salts opposite to each other in their nature. Indeed it is seldom that such aliments are taken into the body as naturally effervesce with each other, but under the title of medicines such things frequently occur; as when for example, crabs eyes or the like absorbent powders are given to one afflicted with the heartburn from an acid, *&c.* But the different smell of the belchings will easily point out the nature of the bodies which being lodged in the primæ viæ produce this elastic vapour. Hence Celsus, in treating on diseases of the stomach, where he directs to suppress a vomiting arising spontaneously, very judiciously excepts that; *Si coacuit intus cibus aut computruit, quorum utrumlibet ructus ostendit, ejiciendus est.* "Wherein the food taken into the 'body is become acrid or putrid, either of which 'will be pointed out by the belchings, and ought 'to be thrown up [n]."

We have thus seen what is the matter of belching and flatus; but unless this matter in the first passages meets with another cause, it does not form either belching or flatus, but freely exhales. But what this accessary cause is we shall explain in the next aphorism.

SECT.

[n] Lib. IV. cap. 5. in fine pag. 209.

SECT. DCXLVIII.

NOR yet will all these (§ 647.) afford any impetuous noise if they are allowed free liberty to exhale; and therefore it is evident that an alternate, convulsive, contraction and relaxation of the sphincter of the gula or œsophageus muscle, and of the upper or lower orifice of the stomach and intestines must always concur at the same time; whence belchings, flatus, farts, and rumbling or croaking of the guts.

There is this wonderful property in the stomach and intestines of men and many other animals, in which experiments have been made, that the vermicular motion of them, which is called peristaltic, continues a long time even after death; and that even when this motion ceases it may be renewed again by fomenting these parts with heat, or by irritating them °. It also appears that acrid substances applied to these parts have occasioned them to be contracted with a spasm or convulsive motion, not only in the place of contact where the acrid substance was applied, but frequently in many of the adjacent parts at the same time, so as to deny all passage to the contents into the intestinal tube or into the cavity of the stomach. It was not without admiration that I saw in a dog who had been dead for some minutes, that if I irritated the stomach by the point of a knife, or by pinching with forceps, it became violently contracted,

not

° Wepferus Hist. Cicut. aquat. pag. 89.

not at the place irritated, but at ſome diſtance from hence, and that to ſuch a degree that the bulk of the ſtomach loſt five parts in ſix of its capacity. When I applied a ſmall drop of oil of vitriol to the external ſurface of the inteſtine in a dog yet living, the gut became inſtantly ſo contracted in that part as if it had been tied together by a ſtring. But this contraction of the inteſtines is ſometimes uſed to be ſo obſtinate that *Wepfer* [p] has obſerved the bowels of thoſe who have expir'd of a colic, as alſo in brute animals, into whoſe inteſtines he had forced purgatives or corroſive ſubſtances, that they were ſo conſtringed in ſeveral places, that the flatus contained betwixt the two contractions, could hardly be drove out from thence either one way or the other. But ſo long as the irritating acrimony continues to act, the flatus expelled is renewed again by more of the ſame kind, as *Wepfer* demonſtrates by a fair experiment [q]. For after he had given half a ſcruple of mercury ſublimate to a dog, when it began to operate upward and downward, upon opening the abdomen the ſtomach immediately burſt forth inflated, and by compreſſing it the flatus eſcaped through the mouth, but was ſoon after fill'd again with the like flatulencies. All theſe particulars being duly conſidered, it is ſufficiently evident what belching and flatus commonly are, and from whence they proceed. For an elaſtic matter wandering about in theſe parts makes the material cauſe; while the efficient cauſe is a ſpaſmodic conſtriction of theſe parts, either from ſome acrid, irritating matter, or from an inordinate motion of the ſpirits. But although the air ſwallowed together with the food and drink, or

[p] Ibidem pag. 91. [q] Ibidem pag. 297.

freely admitted to wander through the firſt paſſages when they are empty, always affords a ſupply of this elaſtic matter, yet it does not occaſion either belching or flatus, unleſs it is alſo attended with thoſe Spaſms. All that has been hitherto ſaid is fairly confirmed by a remarkable obſervation in *Helmont* [r]. For in a monſtrous child afflicted with an umbilical rupture, which extended a hand's breadth and a half, under the thin and pellucid ſkin the inteſtines might be ſeen, and the unfortunate lad, whenever he had the gripes, afforded *Helmont* an opportunity of viewing the motion of the ileum: *Adeo ut inteſtinum iſtud, tanquam ſibi obambulando ebuliiſſet, contorqueri & convelli videretur. Idque maximè, quoties nova tormina infeſtarent. Quæ cum ſub doloribus ſic ſe haberent, voluit etiam ſubter ſanitatem contemplari, qualis eſſet inteſtinorum œconomia. Atque tum obſervavit alium ſucceſſivum plane motum, quo ſe inteſtina exercebant. Nam quoties aliquid ſupernè ad anum tranſmittebatur (erat autem in conſiſtentia liquidioris ſyrupi & obſcure flavum) inteſtinum ſuis ſe tranſverſis fibris contraxit, tanquam penitus iſthac clauderetur, atque excrementum infra ſe depelleret: fiebat enim hoc ſucceſſiva fibrarum tranſverſarum contractura, non ſecus atque fidicen digitum poſt digitum aperit, & priorem laxat. Uſque adeo propellebat quidem excrementum ſimul cum flatu, ſed hic retrocedebat ilico ad priſtinum locum.* "He therefore ſaw that in-
" teſtine boil up, twiſt, and contract as if it was
" walking. And this appeared more eſpecially
" when new gripes came on. But ſince he had
" thus an opportunity of ſeeing what happened
" to the inteſtines during the pains, he was like-
wiſe

[r] In Capitulo de Flatibus N°. 38. pag. 339, 340. & de Lithiaſi cap. 9. No. 132. pag. 734.

" wiſe willing to examine their œconomy under a " healthy ſtate. But then alſo he obſerved another " kind of ſucceſſive motion very plainly, with " which the inteſtines exerciſed themſelves. For " when any thing was tranſmitted from above " towards the anus, (the conſiſtence of the matter " being that of a thin ſyrup, and of an obſcure " yellow colour) the bowel being contracted by " its tranſverſe fibres, was by that means in a " manner ſo perfectly cloſed as to drive down the " fæces from below them: For this contraction " of the tranſverſe fibres was ſucceſſive no other- " wiſe than as a fidler cloſes one finger after an- " other, and opens the reſt. In this manner the " fæces were propelled together with flatus, but " this laſt immediately returned back to its firſt " place." It is therefore evident that the elaſtic matter of flatus is always preſent in the inteſtines, but that flatus and gripes only happen when the inteſtines are convulſed with a ſpaſmodic contraction.

Since therefore this elaſtic matter may be intercepted throughout the whole courſe of the œſophagus, ſtomach, or inteſtines by a ſpaſm or convulſion of the muſcular fibres, it is evident that in all theſe parts flatulent tumours may be formed, diſappearing in a little time, as ſoon as the fibres before contracted are relaxed, and a free paſſage made of the elaſtic matter; but often returning again when ſuch ſpaſms are renewed. Thus the fibres of the œſophagus being conſtringed, the intercepted air forms that globular tumour in hyſterical women, when they falſely believe that the uterus aſcends thither. The orifices of the ſtomach being conſtringed in the like manner, occaſion a great tumour in the epigaſtrium from

the ſame cauſe; and upon a relaxation of its upper orifice, the elaſtic matter is diſcharged by belching; but if it goes out through the pylorus, it is diſperſed through the inteſtines, and eſcaping by the anus with little or no ſound, is only called flatus or wind, otherwiſe with a ſound, a farting. But if the muſcular fibres are ſucceſſively relaxed and conſtringed again, the elaſtic matter wanders thro' the inteſtines with a ſlight murmuring noiſe, which is called borborygmi or croakings of the guts, and which are ſaid to be confined if no diſcharge of flatus enſues. This murmuring is more eſpecially perceived through the tract of the inteſtinum colon.

From what has been hitherto ſaid it is ſufficiently apparent what belching and flatus are in the human body, as well with reſpect to their matter as their efficient cauſe: It therefore now remains for us to ſee what maladies may be thence feared.

SECT. DCXLIX.

IF theſe two cauſes concur together (§ 647, 648.) they act powerfully and continue a long time; and then the elaſtic matter being forced to expand and dilate itſelf, by the heat and motion of the parts, by its own proper force, and by being tied up in a cavity, the fibres of which are conſtringed with a convulſive force, it then diſtends and dilates the confining membranes and excites pain, and by compreſſing the adjacent parts, there follows intolerable anguiſh with colicky pains, ſoon diſappearing

appearing when the flatus is diſcharged (ſee § 220, to 227, and 631, 634.) But if to theſe is added the force of a fever, it occaſions the moſt inexplicable torture.

If therefore plenty of air, or ſuch ſubſtances as ſuddenly produce a great quantity of elaſtic matter, are confined in theſe paſſages, and at the ſame time this elaſtic flatus is intercepted by a ſpaſmodic conſtriction of the fibres, either from ſome acrid irritation, or a diſturbed motion of the ſpirits, the conſtriction being ſo great as to retain the flatus from eſcaping; in this caſe the rarefaction will be increaſed by the heat and motion of the body itſelf, and more elaſtic matter of the ſame nature will be added to the firſt from the flatulent bodies which produced it; whence the confined membranes will be gradually more and more diſtracted, and the moſt dreadful maladies will enſue. But if we conſider what was ſaid at § 220, and the following concerning pain, it will be evident enough that the diſtraction of the parts being thus gradually increaſed muſt produce the moſt intolerable pains. At the ſame time alſo the blood-veſſels, diſpers'd through the membranes thus diſtended, being compreſſed or ſtraitned will occaſion the moſt violent inflammation, and a ſuppreſſion of all the vital circulation of the humours, whence a ſudden gangrene, which ſo frequently proves mortal in theſe parts (ſee § 432.) But alſo the adjacent parts being compreſſed or diſtracted by theſe flatulent tumours, may be likewiſe affected with the ſame maladies. A remarkable inſtance of this we gave in the comment to § 422. N°. 2, where a gangrene was threatened from a com-

preſſion of the iliac vein, by the inteſtinum colon diſtended with wind, which yet being diſcharged, the ſwelling of the leg ſoon diſappeared, and life returned again into the part which was almoſt dead.

If now to theſe we add what was ſaid in the comment to § 170. N°. 3. concerning the wonderful influence or power, which the nerves, diſperſed through the abdominal viſcera, have upon the vital functions, it will be evident enough how great diſorders may ariſe from this cauſe only; and the reaſon will be alſo evident why ſtrong and healthy people often expire in a few hours after they have ſuffered theſe confined or convulſive colics. At the ſame time it is alſo evident that the moſt intolerable anguiſh may ariſe from flatus, when the parts diſtended with wind compreſs the adjacent larger veſſels, concerning which we treated under the title of anguiſh. Moreover, the inteſtines a long time diſtracted by wind may become paralytic, and then they never afterwards return to their natural contraction, but what is taken into the body will be accumulated as in a dilated ſack, and being retained there a long time, will give riſe to new diſorders: Hence the iliac paſſion or introſuſception of the inteſtines, when the low part which is not diſtended, enters into the dilated part of the inteſtine immediately above. Hippocrates [s] therefore very juſtly pronounces that iliac paſſions, gripings of the guts, and other obſtinate diſeaſes ariſe from flatulencies.

But theſe great and numerous diſorders immediately ceaſe, if theſe convulſive ſpaſms being allayed afford

[s] De Flatibus cap. 5. Charter. Tom. VI. pag 217.

afford a free diſcharge to the confin'd air, either upward by belching or downward by flatulent exploſions, or elſe if it has an opportunity to wander ſucceſſively thro' the whole tract of the inteſtines, producing thoſe murmuring noiſes which we call borborygmi or croakings of the guts. If again a violent inflammation or a gangrene does not yet ſucceed, in the membranes diſtracted by the diſtending flatus, but they by too long a diſtenſion become paralytic, even then many diſorders of the worſt conſequence may enſue, though the flatus be diſcharged; and even ſometimes ſudden death has followed, when the unwary have raſhly judged the patient to be out of danger. For ſince in the confined or ſtrangulated colic the intercepted air cannot be diſcharged by any efforts of art, a gangrene is often ſuddenly produced, by which the membranous fabric of the inteſtine being diſſolved, the ſpaſm goes off, and the flatus eſcapes, only it is then too late: for altho' the abſence of pain, and the diſcharge of the flatus may ſeem to give ſuch patients hopes of recovery, yet the coldneſs of the extremities, the weak and intermitting pulſe, and the cold ſweats with a cadaverous countenance, ſufficiently demonſtrate to a ſkilful phyſician that death is near at hand. Therefore Hippocrates ſays, *Dolores ex hypochondriis & tumores, ſi recentes ſint, & ſine inflammatione, ſolvit borborygmus in hypochondrio excitatus, & maxime exiens cum ſtercore, urina & flatu. Si vero non, & ipſe tranſmiſſus. Juvat vero & deſcendens ad inferiores partes.* "That pains and tumours of the "hypochondria being recent and without inflamma- "tion, are diſperſed by a rumbling noiſe excited

[t] In Prognoſtic. Charter. Tom. VIII. pag. 631.

" in the hypochondrium; and more eſpecially " when there is a diſcharge of the flatus and " urine together with the fæces. But if it does " not go off entirely, it removes itſelf, and is of " ſervice by deſcending to the lower parts." Here he juſtly remarks that theſe diſorders being recent and without inflammation are thus relieved. The truth of this is demonſtrated by daily obſervation in hyſterical and hypochondriacal people, who find that the intolerable anguiſh and ſevere pains are often immediately relieved, only by an exploſive diſcharge of wind upward or downward. Is was therefore not without reaſon that Tiberius Claudius Cæſar *dicitur meditatus edictum, quo veniam daret flatum crepitumque ventris in convivio emittendi, cum periclitatum quendam præ pudore ex continentia reperiſſet* [u]. " Is ſaid to have meditated " an edict where by he gave pardon to any one of his " gueſts at table who ſhould break wind upward " or downward, becauſe he found that one had " been in danger of periſhing from confining this " matter through baſhfulneſs."

But when a fever alſo attends at the ſame time that this confined air is pent up in theſe membranous parts contracted by a ſpaſm, it is evident enough how great diſorders muſt thence follow: For it is well known from phyſical experiments that the air may be rarefied immenſely by an increaſed heat; but by a fever the heat of the body is greatly increaſed. Beſides this an inflammation if not yet preſent will ſoon be raiſed by the fever, ſince the humours are urged with an increaſed velocity through the veſſels much ſtraitened or compreſſed by the diſtenſion. But if an inflamma-

[u] Sueton. in Tib. Claud. Cæſ. § 32. pag. 477.

tion is already preſent, it will be ſo far increaſed in a ſhort time by the enraged fever, that after the moſt excruciating torture it ſoon terminates in a fatal gangrene. This is the reaſon why ſkilful phyſicians are not much afraid of colics or gripes in the abdomen, if they are without a fever; but when a fever alſo attends they forſee the worſt conſequences, and therefore they endeavour to cure the preſent or approaching inflammation by the moſt efficacious remedies. If now at the ſame time ſuch things are lodged or confined in the bowels as generate a great deal of elaſtic matter by an increaſed heat, ſuch as ſummer fruits, fermenting liquors ſhut up in the act of fermentation, or the like, it may be ſo far diſtended thereby, with the fever, and increaſed heat thence ariſing, as to burſt the viſcera; for even the ſtrongeſt caſks are burſt open by the elaſtic vapours generated in fermentation. That ſuch dreadful diſorders ſometimes happen, we are taught by the writers of obſervations. And hence the reaſon is alſo evident why Hippocrates affirms in his coan prognoſtics; [w] *In febribus inflata alvo flatum non erumpere, malum.* "That when the bowels are "inflated in fevers without a diſcharge of the "wind, it is a bad ſign."

[w] N°. 45. Charter. Tom. VIII. pag. 853.

SECT.

SECT. DCL.

THE cure of this diſorder is performed 1. by removing the matter (§ 647.) by diluents; by diſſipating the ſame with warm, watery liquors gently aromatized; by removing the equilibrium of the ſalts to the ſide which is neceſſary to predominate; by ſuch things which correct putrefaction and allay fermentation. 2. By ſuch medicines as allay convulſions, mitigate acrimony, and quiet the ſpirits, to be called off from theſe parts; of which the principal are opium, and the mild antihyſterics. 3. By warm relaxing anodyne clyſters, fomentations and epithems, with gentle aromatics, as alſo by the application of cupping-glaſſes to the abdomen without ſcarifying.

From what has been ſaid before it is evident that the cauſe of belching and flatus is two fold, namely an elaſtic matter or air, ſwallowed or elſe extricated out of the food, and then a convulſive ſpaſm or conſtriction of the œſophagus, ſtomach, &c. by which the elaſtic matter is intercepted and confined within the contracted parts. If therefore this elaſtic matter can be diſcharged, or the intercepting ſpaſms be removed, ſo as to make way for the vapours to paſs and repaſs freely, the cure will be obtained. But how and by what means this may be obtained, is our buſineſs to explain in this place.

1. The

1. The ambient air always wanders through the firſt paſſages, and therefore one cannot be able to remove this matter of the flatus which proceeds from the air lodged in theſe parts. But when the air is intercepted by a ſpaſmodic conſtriction of the parts it cannot eſcape until thoſe ſpaſms are removed, concerning which we ſhall treat in the following number of the preſent aphoriſm. But the flatulent matter ariſing from a fermentation, putrefaction or efferveſcence of the ingeſted aliments or medicines may be removed, or at leaſt ſo corrected as to be no longer offenſive. Here diluents hold the firſt place, and are of the greateſt uſe, which as we have often obſerved before are only to be formed of water or watery liquors: For by theſe ſuch matter lodged in the firſt paſſages is attenuated, diſſolved and rendered moveable, ſo as to be very well diſpoſed to be expelled either upward or downward. But theſe watery drinks are to be uſed warm, becauſe heat increaſes their diluent and attenuating power. Moreover, when we uſe our endeavours to remove the cauſes of flatus, we ought always to be mindful that a ſpaſm attends at the ſame time, and therefore that nothing ought to be given that can increaſe thoſe ſpaſms. But it appears from daily obſervation, that by a plentiful drinking of any thing cold, flatus and gripes are often excited, or elſe increaſed if they were there before. For Hippocrates [x] obſerves that cold occaſions convulſions and a tetanos, and is an enemy to the nerves, whereas warmth is friendly to them: And a little after he adds [y] that warmth allays pains and mitigates convulſions and cramps. Since therefore

[x] Aphor. 17. & 18. Sect. V. Charter. Tom. IX. pag. 204.
[y] Ibid. Aphor. 22. pag. 207.

therefore the firſt paſſages are ſo very nervous, and ſpaſms always attend the flatus; the reaſon is evident why the watery drinks are required to be warm. To theſe drinks it is uſual to add agreeable ſpices, which being diluted in a great quantity of water, gently irritate theſe parts by their mild ſtimulus into more equable contractions. For by a continual irritation and contraction of the fibres of the ſtomach and inteſtines, their contents are preſſed and urged forwards; but this contraction ſoon after goes off, and is in a manner renewed again in the next part, as we are taught from obſerving the periſtaltic motion in the diſſections of living animals. I have moreover ſeen, by gently irritating the inteſtines, that a ſpaſm has been raiſed in the part irritated, and ſometimes in another part adjacent; but when I have afterwards in another place made a ſlight irritation of the like kind, I have obſerved the firſt to ceaſe, and another like the former to ſucceed in a different part. It ſeems very probable that all thoſe medicines of the ſhops which paſs under the title of carminatives, operate nearly in the ſame manner; for theſe are in reality obſerved as well to produce flatus as to diſſipate it. For if any one drinks the ſpirit of anniſeed or the like aromatic ſpirits, they will ſoon after belch or break wind upwards, though being before perfectly in health there was no ſenſe of any ſuch flatus. Hence it appears that theſe things may be ſerviceable to remove the ſpaſms already formed, even tho' by the taking of them, a more gentle kind of ſpaſms are inſtantly excited, and as ſoon diſappear. But at the ſame time it is to be obſerved that all theſe aromatics, eſpecially thoſe which are prepared by diſtillation with ſpirit of wine, if they do not immediately relieve as ſoon as given,

they

they may be very miſchievous: For there is danger of increaſing the ſpaſm then preſent by the too violent or often repeated ſtimulus of theſe medicines; and then inflammation is always to be feared in this caſe from ſuch warm remedies, or if an inflammation is already preſent, they may greatly increaſe it. But it is very evident that the uſe of theſe will be much more dangerous, if the flatus is accompanied with a fever and gripes; and it is not unfrequent for fatal errors to be committed in ſuch caſes, as it is generally a cuſtom with the patients to make uſe of ſuch aromatic ſpirits, and often with great freedom, before they ſend for a phyſician. But when the milder aromatics, ſuch as the greater and leſs warm ſeeds, as they are called in the ſhops, are drank infuſed in a great quantity of water, they are of the moſt happy uſe in diſſipating flatulencies; and thus at the ſame time there will be no danger of miſchief from too great acrimony.

By removing the equilibrium of the ſalts.] How ſudden and copious a generation there is of elaſtic air, when oppoſite ſalts are mixed and ferment together, we are taught by many experiments: But it is rarely that belching and flatus ariſe from ſuch a cauſe. But if to infants troubled with an acid in the firſt paſſages a conſiderable quantity of alcaline ſalts is given, the ſtomach may be ſo far diſtended with flatus on a ſudden from that cauſe, that both its orifices will be conſtringed with a convulſive force, which may produce fatal convulſions in ſuch tender bodies, which are ſo eaſily irritable. Hence it is much ſafer to diſſolve thoſe cheeſy and acid coagulums which are often lodged in the ſtomach by giving Venice ſoap, and afterwards to make a diſcharge by a gentle vomit or a purge. Likewiſe

wiſe the uſe of antacid abſorbents, ſuch as crabs-eyes, coral and the like given in ſmall doſes and often is much better than ſalts, becauſe they make a much leſs efferveſcence with acids, and do not make ſo ſudden nor ſo violent an exploſion of elaſtic air by the efferveſcence which they raiſe. But if the cauſe of the flatus be known to ariſe from oppoſite ſalts, making an efferveſcence in the firſt paſſages, the only remedy is to weaken it, by drinking large quantities of diluent liquors, or by taking a greater quantity either of acid or alcaly, that one of them prevailing over the other may cauſe a ſpeedy ceſſation of their mutual conflict. In ſuch a caſe alſo the uſe of oil of almonds or any other emollient is of the greateſt ſervice; for by this means the acrimony of the oppoſite ſalts is obtunded, ſo that they can act upon each other only with a leſs force.

By ſuch things as correct putrefaction.] That putrefying humours generate the elaſtic matter of belching and flatus, was ſaid before at § 647. But the putrid ſmell of ſuch belchings and flatus, together with the ſigns before-mentioned (§ 84, to 87.) ſufficiently denote the preſence of this cauſe. In this caſe ſuch things as correct putrefaction, and eſpecially acids, will diſſipate the flatus: And among theſe acids there is hardly a remedy which recommends itſelf more to uſe than the ſpirit of nitre and ſea ſalt, united by a long continued digeſtion with alchohol of wine; for which *ſpiritus nitri dulcis* is, above all, much recommended by authors as a powerful diſcutient for wind or flatus. Yet is not its uſe ſo univerſal as many would have it, but only in ſuch a caſe it is ſerviceable.

And allay fermentation.] A very frequent and often dangerous cauſe of flatus is the taking in of

ſuch aliments as are very prone to fermentation. Hence ſummer fruits eaten in large quantities frequently produce the worſt diſorders, as they immediately begin to ferment by the heat of the body; and this more eſpecially when wine is drank after them, as is the cuſtom of many, thinking by that means to correct the coldneſs which they ſuppoſe to reſide in the fruits. It is well known that the juice of grapes immediately froths or ſparkles and ſhews ſigns of a beginning fermentation, almoſt as ſoon as it is expreſſed; and the ſame thing is alſo obſerved more or leſs in the juices of the other ſoft fruits. Nor are theſe hurtful only inaſmuch as they generate a great quantity of elaſtic matter, but alſo becauſe the ſpirit or gas, which is called wild by Helmont, being produced by fermentation, is extremely apt to raiſe ſpaſms, having a wonderful power and influence over the whole nervous ſyſtem. The beſt remedy in this caſe is immediately to expel the fermenting matter either upward or downward, as it often happens ſpontaneouſly, when a moſt violent cholera ariſes from ſuch cauſes. But if this cannot be ſafely performed, the fermentation begun muſt be ſuppreſſed as ſoon as poſſible. But there are here only two things to be uſed out of thoſe which are able to allay fermentation, namely by the ſpirit of ſulphur by the bell, as it is called in the ſhops, prepared by condenſing the vapours of burning ſulphur; or elſe the earthy abſorbents, which being copiouſly uſed effectually deſtroy every thing acid ariſing from fermentation [z]. For it appears from the moſt certain experiments that the fumes of burning ſulphur being ſhut up in cloſe veſſels which contain juices very apt to ferment, do effectually reſtrain all fermentation,

[z] Vide. H. Boerh. Chem. Tom. II. pag. 186, 187.

tion, and therefore it is not without reaſon that we may here expect the like effects from the ſpirit of ſulphur. But when the fermenting liquor has acquired a conſiderable acid acrimony in the firſt paſſages, the earthy abſorbents before-mentioned are moſt to be recommended.

2. It was ſaid before (§ 648.) that the efficient cauſe of flatus was a convulſion or ſpaſm of thoſe parts which naturally contain the elaſtic matter of flatus and belchings, which matter being intercepted in theſe parts contracted by a ſpaſm, has produced all thoſe diſorders enumerated in the preceding aphoriſm. It likewiſe appeared at the ſame time that all the belchings and flatus vaniſh when theſe ſpaſms are removed. It likewiſe appeared from the experiments before enumerated, that acrid ſubſtances applied to theſe nervous parts, produced ſuch ſpaſms whereby the elaſtic matter might be intercepted, and therefore every thing which obtunds or weakens acrimony, will cure convulſions ariſing from this cauſe. Such things therefore as allay acrimony will anſwer this intention; and theſe are either general, which dilute or ſheath as well as mitigate acrimony; to which uſe ſerve diluent watery drinks recommended in the preceding number of the preſent aphoriſm; as alſo ſoft oils taken in a large quantity, all which take off the edge of every thing acrid, and at the ſame time ſo defend theſe parts which they line, that they are either not at all or but very little affected by the acrimony lodged here; they likewiſe are very uſeful in relaxing and mollifying the contracted fibres. This is the reaſon why linſeed oil or the like, drank to the quantity of a pound or two in ſome of the moſt dangerous caſes, where a gangrene has already begun to appear, has frequently ſaved the patient

patient out of the jaws of death. But as this known acrimony varies, different kinds of correctives are to be uſed: Thus acid acrimony is mitigated by alcalies or earthy abſorbents; but putrid alcaline acrimony is corrected by acids, and ſo of the reſt. But concerning all theſe we treated before in the comment to § 605.

But only a greater determination of the nervous ſpirits to ſome parts, from whatever cauſe derived, may excite ſpaſms and convulſions. For there are cauſes ſufficient to diſtend at one and the ſame time, all the voluntary muſcles which come under the influence of the will. If therefore out of that great quantity of ſpirits which is always at hand, a derivation is made to ſome certain part, that part will be immediately affected with a true cramp. Thus for example, when a man falling into the water, catches hold of a ſtick which is put out to him, the ſpirits flow with ſo great force into the muſcles of that part, that he will not only hold faſt the ſtick, ſo as to ſuſtain the weight of his whole body; but when ſuch a perſon has been thus drawn out of the water, the determination has been obſerved ſo ſtrong and ſo durable, that he has not been able by any force for ſeveral minutes to looſen his hand from the ſtick. If therefore theſe ſpaſms happen either in hyſterical or hypocondriacal people from a diſturbed motion of the ſpirits, we are then to have recourſe to ſuch things as are able to allay theſe diſturbances. But among theſe, opium deſerves the firſt place, as a true quieter of the tumultuous ſpirits, and by the uſe of which Sydenham [r] teſtifies he has been able to eaſe the moſt ſevere pains, vomitings, diarrhæas, &c. ariſing from a diſturbed motion of the ſpirits. When the fibres of the inteſtines are contracted with a ſpaſm in ſtrangu-

(r) In Diſſertat. Epiſtol. pag. 506.

lated ruptures, and the inteſtines thus diſtended with the elaſtic matter cannot be returned, plentiful bleeding being premiſed to prevent inflammation, which is much to be feared in ſuch a caſe, opium then given has often happily removed theſe ſpaſms, and freed the patient from imminent danger of death. Hence therefore it is juſtly ranked in the firſt place among thoſe remedies which are termed carminative, that is to ſay, which diſcuſs wind. Hitherto alſo belong thoſe anti-hyſteric medicines, which, *Quæ fœtoris exhalatione repellendis ſpiritibus, ſeditionem molientibus, & in loco ſuo continendis apta nata ſunt.* "From their "fœtid exhalation are known to be ſuited for re-"pelling the ſpirits and confining them within "bounds, when they endeavour to raiſe a diſtur-"bance [s]." Thus we ſee that the ſtrength of caſtor and fœtid ſmell of aſafœtida, with the fumes of burnt hoofs of animals, *&c.* almoſt inſtantly allay theſe wonderful diſturbances, and take off the ſpaſms. But in the preſent caſe only the more gentle antihyſterics obtain, becauſe we muſt not have recourſe to the more acrid and heating, ſuch as ſpirit of ſal ammoniacum, the volatile oily ſalts, and the like, for fear of inflammation.

It is well worth obſerving in this place, the error of ſome, who endeavour to allay theſe ſpaſms by ſuddenly exhauſting the body with profuſe bleedings. For although blood-letting is often uſeful in this caſe to remove the inflammation already formed in the diſtended parts, or in the adjacent compreſſed parts; yet to remove thoſe ſpaſms, a profuſe and ſudden evacuation is a doubtful remedy, ſince a convulſion may follow from that cauſe only, as we obſerved before upon another occaſion

[s] In Diſſertat. Epiſtol. pag. 507

ſion at § 232. For here it is ſufficient to alter the determinate courſe of the ſpirits by mild antihyſteric remedies, or elſe to allay their impetuoſity by narcotics.

3. But all thoſe things which have been enumerated under the preceding numbers of the preſent aphoriſm, may be likewiſe applied, and with very good ſucceſs, in the form of a clyſter: for although clyſters are only received into the large inteſtines, and hardly ever penetrate into the ſmaller, yet they are very uſeful, inaſmuch as the cauſe of the flatus is often ſeated in the colon, and the hard fæces being accumulated in the large inteſtines, they may thus be commodiouſly waſhed out by clyſters. Beſides this, the large inteſtines being filled with a warm emollient liquor, it performs the office of a fomentation to the adjacent ſmall inteſtines. Hence in the more deſperate caſes it may be convenient to inject a clyſter of the like kind every hour, and as there is danger then in delaying the preparation of a clyſter, in the common method, linſeed oil with water and honey will afford a very proper matter. But when ſuch emollient clyſters have been uſed ſeveral times without ſucceſs, recourſe may be had to the more acrid, that the large inteſtines being irritated by their means, the ſpaſms may be removed from the other parts: for that this may ſometimes happen, is evident from what was ſaid under the firſt number of the preſent aphoriſm. I remember myſelf to have ſucceeded ſometimes in this caſe, by ordering an ounce of ſal gem diſſolved in a pint of water, and I have even ſometimes uſed clyſters, prepared from black hellebore, colocynthis, and the like, with happy ſucceſs, provided there were no ſigns denoting an inflammation already formed, for by theſe acrid ſtimuli a great quantity of flatus

has often forcibly discharged itself together with the fæces. But when, these being also tried, the disorders are not alleviated, the disturbances excited by these must be immediately allayed by narcotics.

At the same time also warm fomentations of laxatives and anodynes applied to the whole abdomen will be very useful, taking care not to let them grow cold, for then they would be prejudicial; but this may be prevented by the application of tiles heated and wrapped up in cloths, or bags full of warm sand. The patient is sometimes immerged into a warm bath for the same purpose. But what benefit may be expected from these means in allaying spasms and convulsions, is evident from what was said before in the comment to § 164. For when Galen perceived convulsions approaching in himself from a violent distraction of the muscles preceding, he prevented that disorder by a continual affusion of warm oil; and he testifies, that he immediately perceived a distension and convulsion of the muscles of the neck approaching, if he did but omit the pouring on of the warm oil for a short time. The like things are also recommended by Hippocrates [t] for the cure of the iliac passion, and after having tried them all in vain, he has been bold enough to insert a pair of bellows into the anus, and forcibly drive in the wind to dilate the contracted intestines. Sydenham [u] orders live whelps to be applied to the naked abdomen, in order to allay the horrid spasms of those afflicted with the iliac passion by so mild a warm fomentation, which is at the same time so very friendly to the nature of the human body. For the like purpose, I likewise used carminative em-

[t] De Morbis Lib. III. cap. 13. Charter. Tom. VII. pag. 588. [u] Sect. I. cap. 4. pag. 91.

emplaſters, as they are called in the ſhops, to repel the perſpirable vapours, which moiſten and relax, while by the grateful ſtimulus of the aromatics in their compoſition, they are likewiſe uſeful by exciting a gentle warmth.

But we hardly yet know a more preſent remedy to remove theſe ſpaſms, whereby the flatulent matter is intercepted and confined, than the application of cupping-glaſſes: for by theſe even Galen [w] has long ago obſerved, that pains ariſing from the flatulent ſpirit are immediately removed, as if by a charm. That theſe were very frequently in uſe among the antients, is evident from Celſus [x]. But they had two kinds of cupping-glaſſes, of which one ſort only had a ſingle opening, which was applied to the ſkin immediately after ſome burning flax was put into the glaſs. But the other kind had a mouth as large as the former in one part, and in another part was a ſmall opening, by which they extracted the air by ſucking, and afterwards cloſed up the orifice with wax. But in both caſes the air in the cavity of the cupping-glaſs is diſcharged, whether by driving it out with the burning flax, or extracting it by ſucking. Hence the preſſure of the incumbent atmoſphere upon the glaſs prevailing, preſſes it very cloſe to that part of the body to which it is applied, and obliges it to ſtick faſt: the reaſon of this phænomenon eaſily appears from phyſics. But the humours flow more copiouſly and impetuouſly into that part which is covered by the cupping-glaſs, ſince the preſſure of the atmoſphere is there taken off, or at leaſt greatly diminiſhed: hence tumour and redneſs always ariſe more or leſs in the part, in proportion as the cupping-glaſs adheres more

[w] Lib. XII. meth. medend. cap. ultimo Charter. Tom. X. pag. 292. [x] Lib. II. cap. 11. pag. 82.

forcibly, and for a longer time. At preſent cupping-glaſſes are very commodiouſly applied to almoſt any part of the body, when the air is extracted out of the cavity by the application of the air-pump: and thus we are able at pleaſure to make them adhere with a greater or leſs force, and at the ſame time to remove them without uneaſineſs, while by raiſing the valve the air is admitted, which was before prevented from entering into the cavity of the glaſs. But it is often difficult to remove cupping-glaſſes, which have only one opening, and are applied to the ſkin with the flame of burning flax or ſpirit of wine, more eſpecially when they firmly adhere, and are almoſt filled with the ſubjacent fleſh riſing into their cavity. Hence Oribaſius [y] cautions againſt the application of cupping-glaſſes to the breaſts; for the ſubſtance of the breaſts being drawn into the cavity of the glaſs, and, being diſtended, render the avulſion difficult. But all theſe inconveniencies are avoided by the uſe of ſuch cupping-glaſſes as permit the air to be drawn out by the pump, and to be admitted again.

It ſeems to have been the opinion of the antients, that cupping-glaſſes draw the ſpirit, that is the air, or material cauſe of flatus, from the deepeſt parts of the body; for theſe are the words of Celſus [z] concerning the cupping-glaſs, *Ubi inhæſit, ſi conciſa ante ſcalpello cutis eſt, ſanguinem extrahit: ſi integra eſt, ſpiritum. Ergo ubi materia, quæ intus eſt, lædit, illo modo: ubi inflatio, hoc imponi ſolet.* "When it ſticks faſt, if the ſkin is be-
"fore inciſed by a ſcalpel, it extracts blood; but
"ſpirit or air, if the ſkin is whole: when there-
"fore the matter included injures in this manner,
"it is uſual to apply the cupping-glaſs where the in-

[y] Charter. Tom. X. pag. 456. [z] Lib. II. cap. 11. pag. 83.

"inflation appears." But it appears at preſent, from the moſt certain obſervations, that the elaſtic air is not of ſuch a nature as to be able to paſs through the coats of the inteſtines, peritonæum, muſcles, fat, &c. into the cavity of the glaſs; but cupping-glaſſes ſeem to perform their efficacy by deriving the humours more copiouſly and impetuouſly into thoſe parts of the body to which they are immediately applied, and by that means to make a revulſion of them from the adjacent parts; at the ſame time alſo the nerves diſperſed through the part under the cupping-glaſs, are often irritated and excited to pain, by which means the ſpaſms, raiſed in other parts may be removed, as is evident from what was ſaid before in the beginning of this chapter. For we know, by daily experience, that the tumultuous force of the diſturbed ſpirits in any part may be allayed, by applying remedies to other nerves, and often in diſtant parts. When the ſtrong ſmell of caſtor, or ſtinking fumes of a burning hoof, penetrate the noſe of an hyſterical woman, it often immediately removes thoſe ſpaſms of the abdominal viſcera in a wonderful manner: and on the contrary, the fragrancy of muſk and civet has often thrown hyſterical women into the worſt convulſions. For the nerves, diſperſed through various parts of the body, have a wonderful influence upon other nerves often very diſtant; and we even know for certain, that an injury inflicted upon a few nervous fibres, may wonderfully diſturb the whole body in all its functions, as is evident from what we ſaid before concerning wounds of the nerves and tendons in the hiſtory of wounds in general. It is not therefore repugnant to the known laws of the human œconomy, eſtabliſhed by faithful obſervations, that ſpaſms raiſed in ſome parts may be quieted by irritating, or making an

alteration in the nerves of other parts, although we cannot eaſily explain it *a priori*, from what we as yet know concerning the fabric of the nerves; and on the other hand we know that often wonderful ſpaſms and other dangerous diſorders are produced from the very ſame cauſes, though applied to very foreign parts. There are many people ſubject to theſe ſpaſms of the abdominal viſcera from ſuch ſlight cauſes, that if they ſtand any conſiderable time upon a ſtone pavement, they are immediately puniſhed for it with ſevere gripes; and I have even known ſome liable to the ſame diſorders, if they did but dip their hand at any time in cold water, or even barely handle wet linnen or the like, eſpecially in winter-time. On the other hand again, we are greatly ſurpriſed in the colica pictonum, that after the moſt ſevere fits, the patient's arms and legs become paralytic; and even in the more obſtinate kind of the diſeaſe, they waſte away, as in a true maraſmus: but in the mean time the beſt method of cure for this dreadful malady, is by frictions with aromatic emplaſters applied to the abdomen, the farinaceous gums given internally, *&c.* the remedies being rather applied to the abdomen than to the paralytic extremities of the body.

The method therefore of burning the ſoles of the feet by the application of hot irons, uſed in Aſia to eaſe the moſt ſevere pains of the cholic, does not ſeem to be at all unreaſonable. M. Homberg [a], who was born in the iſland of Java, aſſures us that the inhabitants cure colicky pains and dyſenteries by this method, which would be otherwiſe mortal. The ſame thing is alſo confirmed by many writers of voyages and travels.

Thus

[a] Academ. des Sciences l'An. 1708. Hiſt. pag. 57.

Thus we meet with a wonderful obſervation [b] of a man, who drinking much, after having travelled in the moſt ſcorching heats of the ſun in a very hot country, was ſeized with the moſt cruel ſpecies of colic, called mordechin; and after ſuffering the moſt excruciating pains, he lay almoſt deſtitute of ſenſe, and agitated with violent convulſions. The ſoles of the feet in this man were burnt with a hot iron, at about three fingers diſtance in the heel, till the thick cuticle being burnt thro', he could perceive the pain (for if the patient perceives no pain from the operation, the caſe is too far gone;) the like cauterization was repeated upon the ſole of the other foot, and the burnt parts afterwards ſprinkled with pulverized ſalt (or, in defect of that, burnt aſhes will ſuffice) by which means all the ſymptoms were removed in half a quarter of an hour's time, only an intenſe thirſt with great weakneſs remaining. They gave him for drink water, with which a little pepper and onions had been boiled. A moſt expert phyſician who practiſed phyſick a long time at the court of the Great Mogul, affirms, that he can cure every colic by applying to the abdomen an iron ring heated red-hot, the diameter of which is about an inch and a half, fixed ſo that the navel may come into the center of the ring, which he takes off as ſoon as ever the patient perceives the burning. The acupuncturation of the Japoneſe, and the burning of moxa upon various parts of the body, ſeem to operate in the ſame manner, namely, inaſmuch as by irritating the nerves they wonderfully allay the pains and ſpaſms ſeated in other parts of the body. It is therefore of the greateſt uſe to learn by experiments the wonderful conſent of the nerves, and in what parts of

[b] Lettres edifiantes & curieuſes des miſſions etrangeres Tom. IX. pag. 250, &c. 254.

of the body thoſe nerves are ſeated, by the irritation of which other ſpaſms may be allayed. The Aſiatic phyſicians, little ſkilled in anatomy, have yet been able to learn by experience how to chuſe ſuch parts in the cure of different diſeaſes, as by burning with moxa, or pricking with a needle, a happy cure may enſue. It was a very frequent practice with Hippocrates and the antient phyſicians to burn ſeveral parts of the body in many diſeaſes, as is evident from the many paſſages which have been collected by the celebrated phyſician Ten Rhyne [c], who practiſed phyſick in the iſland of Java and Japan, and made a diligent enquiry into all theſe particulars. He openly confeſſes that he was ſo greatly diſordered for the ſpace of three months with a troubleſome palpitation of the heart and fainting, that he often believed he was expiring; but after many remedies tried in vain, he at length applied cauterizations made with the moxa or cotton of a kind of mugwort, three cauterizations or ſtoops on each ſide the navel, and two upon the region of the loins, and immediately he perceived relief to his pain and anguiſh; and after a copious diſcharge of ichor had flowed for the ſpace of about twenty days, from the little ulcers which remained from the burning, he was entirely freed from this troubleſome diſorder [d].

Whether or no the aphoriſm of Hippocrates [e] does not relate to this, where he ſays, *Duobus doloribus ſimul obortis non in eodem loco, vehementior alterum obſcurat?* "That two pains ariſing together at the ſame time in different parts, the more vehement pain obſcures the other?

The

[c] De Arthritide pag. 119, & ſeq. [d] Ibid. pag. 143.
[e] Aphor. Sect. II. Charter. Tom. IX. pag. 84.

The application of cupping-glaſſes will often happily ſupply the place of this ſeemingly ſtrange and cruel method of burning, and greatly conduce to remove the ſpaſms which make the efficient cauſe of flatus; but that the material cauſe, namely the elaſtic matter, cannot be removed by cupping-glaſſes, is ſufficiently evident from what has been ſaid before. Nor is it neceſſary to diſcharge the flatus in that manner, if it were poſſible, ſince when the ſpaſms are removed, the elaſtic matter intercepted will eaſily find itſelf a paſſage to eſcape. Since therefore there is no evacuation aimed at in this caſe by cupping-glaſſes, there will be no need of ſcarifications. But concerning the various uſe of cupping with and without ſacrification among the Ægyptians for the cure of diſeaſes, a more particular account may be ſeen in Proſper Alpinus [f].

SECT. DCLI.

FROM theſe conſiderations (§. 646, to 651.) anſwers may be given to theſe otherwiſe obſcure queſtions: namely what foods, drinks, poiſons, or medicines, are flatulent. Why they are particularly ſo, when the firſt paſſages are empty? And why when they are wounded, or when the abdomen is ſtrictly conſtringed or bound up? Laſtly, why flatulencies happen to hypochondriacal, hyſterical, convulſed and colicky patients.

From what has been hitherto ſaid concerning the matter or efficient cauſe of belchings or flatus, a reaſon may be given for ſeveral things; which, without underſtanding theſe particulars, would ſeem obſcure enough.

What

[f] De Medicina Ægypt. Lib. II. cap. 13. pag. 139. & ſeq.

What foods.] Every thing which by the heat of our body generates elaſtic air, or rather from whence the latent air is extricated by the heat of the body, ſo as to acquire again its elaſtic force. Malpighi has demonſtrated that a true air is contained in the trachæa or air-veſſels of plants. And Boyle has taught us, and after him the incomparable Dr. Hales with great induſtry has ſhewn by many experiments, that a great quantity of elaſtic air is contained in, and may be extricated from many parts of animals, vegetables, and even foſſils. All thoſe vegetables therefore which contain in themſelves a great quantity of elaſtic air, yield flatulent food, inaſmuch as they ſupply plentifully the matter of flatus. If now there is alſo ſuch an acrimony in theſe, as may irritate the fibres of the ſtomach and inteſtines into ſpaſmodic contractions, the two cauſes of flatus will concur together, and ſuch things above all are juſtly eſteemed flatulent. Hence garlic, onions, and radiſhes generate ſo great a quantity of flatus, becauſe they contain a great quantity of air, and irritate the firſt paſſages by an acrid ſtimulus. But theſe are more eſpecially flatulent, when they are eaten raw; for in boiling, a great quantity of the elaſtic air which they contain is expelled by the heat of the boiling water. Moreover, every thing which is greatly inclined to fermentation or putrefaction is likewiſe flatulent, becauſe from fermenting and putrefying ſubſtances a great quantity of elaſtic air is extricated; and for this reaſon all the ſummer fruits, and eſpecially in the moſt intenſe ſummer heats, inflate the bowels ſo much with wind. Hitherto alſo belong all glutinous ſubſtances, becauſe in theſe a great quantity of common elaſtic air may be embodied in maſtication, which, being afterwards

rarefied

rarefied by the heat of the ſtomach and inteſtines, will be ſet at liberty again.

Drinks.] Of all drinks water is the leaſt flatulent, becauſe the unelaſtic air lodged in it cannot be extricated by the heat of the body ſo as to become elaſtic. But the moſt flatulent of all drinks are thoſe taken in the act of fermentation; as for example, the ale which is cloſe ſhut up in very ſtrong bottles, and flies out with the greateſt force upon opening them; for by an imprudent uſe of ſuch, the moſt ſevere colic, iliac paſſion, and cholera morbus, frequently enſue. Next to theſe come ſuch drinks as have not yet fermented, but are ſoon ſet to work by the heat of the body; as for example, muſt, new wine, or ale wherein no bitter herbs, ſuch as hops, wormwood, *&c.* have been boiled as a preſervative.

The antient phyſicians have obſerved that all the like aliments taken as food or drink produce flatulencies, having learnt it from a faithful obſervation, and not from underſtanding the cauſes. Thus Celſus[g], enumerating thoſe things which inflate the belly adds, *Omnia fere legumina, pinguia, prædulcia, jurulenta, muſtum, atque etiam id vinum, cui nihil adhuc ætatis acceſſit: ex oleribus allium, cepam, braſſicam,* &c. *quidquid denique ſubcrudum aliquis aſſumpſit,* recenſet. "Almoſt all ſorts of "pulſe which are fat, ſweet, and diſpoſed to make "broths, with muſt, and even wine itſelf, which "has not yet acquired any conſiderable age: "among the potherbs, garlic, onions, cabbages, "*&c.* and laſtly whatever is eaten raw by any "one."

Poiſons.] The moſt ſharp and corroding poiſons are flatulent, not from their generating air or elaſtic

[g] Lib. II. cap. 26. pag. 104.

tic matter, but becauſe, by irritating the fibres of the ſtomach and inteſtines, they excite the moſt violent ſpaſms, where by the elaſtic matter, always wandering in the firſt paſſages, becomes intercepted, and being greatly rarefied by heat, ſo far diſtends the ſenſible membranes as to produce the moſt excruciating pains. If now theſe poiſons have alſo a power of inducing a ſudden putrefaction in our humours, they are the very worſt of all. From hence the reaſon is evident, why arſenic, corroſive mercury, ſublimate ſharp cauſtic poiſons cauſe the abdomen to ſwell to ſuch a degree that it is often ready to burſt. Perhaps alſo there are other wonderful poiſons, which either by exciting a ſudden putrefaction, or by ſome other unknown latent force, are able to extricate the matter from our humours, whence enſues an immenſe flatulent tumor of our whole body. When the ſerpent Preſter bit Naſidius, we read that his whole body was immediately ſwelled, and that the wonderful effects of this poiſon did not ceaſe even after death [h].

——— *Illi rubor igneus ora*
Succendit, tenditque cutem pereunte figura.
Miſcens cuncta tumor toto jam corpore major,
Humanumque egreſſa modum ſuper omnia membra
Efflatur ſanies latè tollente veneno.
Ipſe latet penitus congeſto corpore merſus,
Nec lorica tenet diſtenti corporis auctum, &c.
——— *tumidos non capit artus*
Informis globus & confuſo pondere truncus.
Intactum volucrum roſtris, epulaſque daturum
Haud impune feris, non auſi tradere buſto,
Nondum ſtante modo creſcens fugêre cadaver.

Medicines.]

[h] M. Annæi Lucani Pharſal. Lib. IX.

Medicines.] All thoſe which have a conſiderable acrimony are flatulent, under whatever denomination they are taken; more eſpecially when they are applied to ſuch people as have the whole nervous ſyſtem eaſily irritable. Hence it is that the moſt ſevere gripes and flatus are often excited by the more acrid vomiting, and purgative medicines. And even the remedies themſelves, which are uſed to diſſipate flatus, may be in one ſenſe termed flatulent, ſince by their ſtimulus, however mild, gentle, and ſoon diſappearing, they excite the ſtomach and inteſtines into moderate ſpaſms or contractions, and by that means relieve the more violent ſpaſms raiſed in the other membranes of theſe parts. Moreover, many of thoſe things among the food and drinks which are flatulent, are uſed under the title of medicines; for thus the juices of ſummer fruits, garlic, onions, *&c.* are often taken.

And why more eſpecially they are ſo when the firſt paſſages are empty?] Becauſe then the air freely wanders through the inteſtines, and indeed in a greater quantity; and at the ſame time the affluent bile and reliques of the ingeſted food being rendered more acrid, gently irritate and ſtimulate theſe parts; whence the air is intercepted here and there by ſlight ſpaſms, which, afterwards going off, it wanders with a murmuring noiſe, ſo as to produce borborigmi or croakings of the guts. For they who have faſted a conſiderable time have the bile often more acrid and bitter, or ſometimes they belch up a ſaltiſh or a ſouriſh liquor: and from this cauſe the empty inteſtines of hungry people are ſaid to murmur.

Why when they are wounded?] From the profuſe hæmorrhage, which (as we obſerved before § 232.) brings on ſpaſms and convulſions; as alſo the ſame happens when nervous or tendinous parts

have been injured by a wound; but more eſpecially above all, when the abdominal viſcera and particularly the meſentery or inteſtines have been wounded; ſee what has been ſaid upon this ſubject at § 170. N°. 3.

Why when the abdomen is ſtrictly conſtringed or bound up?] Becauſe the inteſtines being then compreſſed, the free paſſage of the elaſtic matter contained in their capacity is intercepted. Hence is the flatus ſo often very troubleſome to virgins, whoſe mothers endeavour with great care to give them a ſlender waiſt by tight lacing, powerfully conſtringing the whole abdomen [i]. For this reaſon the unhappy girls are frequently tortured, 'till by unlacing them the abdominal viſcera have an opportunity of returning to their due freedom.

Why flatulencies happen to hypochondriacal, &c.] There are two kinds of diſorders uſually comprehended under the denomination of hypochondriacal. Either an atrabiliary fæculency of the blood depoſited in the abdominal viſcera, and diſturbing the action of thoſe viſcera, cauſing the humours to degenerate, which are ſeparated by their fabric, though the efficacy of thoſe humours is altogether neceſſary to make a due change in the ingeſted aliments. For this reaſon the ingeſted aliments will not be formed into good chyle, but by a ſpontaneous degeneration will be corrupted into a crude acid, a rancid, oily, or a putrid alcaline acrimony; whence a great quantity of the elaſtic matter will be produced, and at the ſame time the inteſtines will be irritated, and thrown into convulſive ſpaſms by the acrimony reſulting from the ingeſted aliments; and therefore belchings and flatus in ſuch people are ſo frequently ranked among the ſigns of an atrabiliary matter occupying the abdominal viſcera,

[i] Terentius in Eunucho Act. II. Scen. III. verſ. 24.

cera, as will be more apparent hereafter at § 1099. But in others there are frequent ſpaſms of the abdominal viſcera, without any ſigns of an atrabiliary cacochymy; by which ſpaſms the air contained in the ſtomach and inteſtines is always intercepted ſo as to produce belchings and flatus. This more eſpecially takes place in ſuch men as exerciſe their minds much, but their bodies little; and hence the diſorder is ſo familiar to men of letters, and ſeems to ariſe only from an inordinate motion of the ſpirits.

Hyſterical women.] When the like irritability and diſturbed motion of the ſpirits occur together in women, they are ſaid to be hyſterical; and that becauſe all theſe diſorders have been commonly aſcribed to the uterus; but in the mean time if we compare the ſymptoms of the hypochondriacal paſſion in men, happening without any atrabiliary matter, with thoſe of the hyſteric fits, as they are called, in women, we ſhall hardly find more difference than betwixt one egg and another, as Sydenham [k] very well obſerves; and therefore from what has been ſaid, the reaſon is evident why flatus and belchings are ſo troubleſome to hyſterical women.

Why in thoſe who are convulſed?] For the nervous fluid ruſhing with an alternate force into the convulſed muſcles, indicates a diſturbed motion of them (ſee § 231;) and from a convulſion may be juſtly feared a diſturbace of all the actions (ſee § 233;) but more eſpecially the functions of the brain, and the nerves which thence proceed, may be wonderfully diſturbed by convulſions: no wonder therefore if the like diſturbance happens in the nerves, diſperſed through the abdominal viſ-

[k] In Diſſertat. Epiſtol. pag. 486.

cera, whence ſpaſms, and conſequently belchings and flatus may be produced.

And in colicky patients.] Thoſe who are frequently troubled with pains in the colon are ſaid to be colicky. But although a moſt ſevere pain ariſes from inflammation in this gut, which may frequently prove fatal by turning to a ſudden gangrene, as we ſhall declare hereafter at § 963. Yet from common uſe it has been cuſtomary to call that pain a colick, which is not ſo fatal, but returns often, and commonly derives its origin from the fæces collected in this inteſtine, with the flatulent matter being intercepted and obſtructed in their free courſe through it. Hence Celſus [l] ſays, *At ſi laxius inteſtinum dolore conſuevit, quod κῶλον nominant, cum id nihil niſi genus inflationis ſit, &c.* "But if the larger inteſtine, which is called the "colon, has been uſed to a kind of pain, ſince that "is nothing more than a kind of inflation, *&c.*" And a little after he orders thoſe who are thus affected to avoid cold, and every thing that does uſually breed flatulencies: from whence it is evident that this is a chronical diſorder returning at intervals; which is yet more evident from another paſſage in the ſame author [m], *Is autem morbus, qui in inteſtino pleniore eſt, in ea maximè parte eſt, qua cæcum eſſe propoſui. Vehemens fit inflatio, vehementes dolores, dextra magis parte: inteſtinum verti videtur; quod prope ſpiritum elidit. In pleriſque poſt frigora cruditateſque oritur, deinde quieſcit; & per ætatem ſæpe repetens ſic cruciat, ut vitæ ſpatio nihil demat.* "But this diſeaſe, which is "ſeated in the larger inteſtine, lies moſtly in that "part which forms the cœcum, as I have already "obſerved. There is a violent inflation, and in-

"tenſe

[l] Lib. I. Cap. 7. pag. 37.

[m] Lib. IV. cap. 14. pag. 223.

" tenſe pains more on the right ſide; the inteſtine " ſeems to be twiſted, becauſe it reſiſts the adja- " cent air. It ariſes in moſt people after cold " things and crudities, and then ceaſes, but re- " turning often, as age advances, it tortures the " patient, but in ſuch a manner as not to ſhorten " his life." From what has been ſaid alſo of colics by Aretæus [n], we may conclude that flatulent matter, intercepted in the inteſtines contracted by a ſpaſm, occaſions this diſeaſe; for his words are theſe, *Sin autem cibum acceperint, quantumvis paucum, & non flatulentum, validè inflantur, & difflandi quidem cupiditas eos inceſſit, verum flatus exitum non inveniunt; ructus vero ſurſum violenter tentati etiam ſine fructu fiunt. Si qua vero parte flatus vi erumpant, qui ſurſum viroſi odoris ſunt, & acidos ructus excitant, &c.* " But although they " take food ſmall in quantity, and not flatulent, " they are nevertheleſs violently inflated, and have " a ſtrong deſire to break wind, but the flatus " finds no exit; they have likewiſe fruitleſs en- " deavours to diſcharge wind forcibly upwards by " belching. But if they forcibly diſcharge the fla- " tus either way, that which comes upward is of " a ſtrong ſmell, and excites acid belchings, *&c.*" But from all this it is ſufficiently evident that colicky patients are troubled with belchings and flatus; the truth of which is ſtill more confirmed by the remedies recommended by Celſus [o] for the cure of this diſeaſe. For he recommends dry and warm fomentations and cupping without ſcarification, the efficacy of which in curing ſpaſms, which make the efficient cauſe of flatus, we have before explained. Moreover, the Remedy which Caſſius glories to have found out himſelf, and which was

[n] Lib. II. de Cauſis et ſignis morbor. diuturnor. cap. 8. pag. 59. [o] Lib. IV. cap. 14. pag. 223.

termed anticolic, from its great uſe in this diſeaſe, takes in anniſeeds, caſtor, pepper, opium, *&c.* all which are extremely well adapted to diſcuſs flatulencies, as is evident from what we advanced before. It deſerves alſo to be remarked here, that Celſus in the ſame place orders, *Frictione ad extremas partes, id eſt, crura brachiaque materiam evocare.* "By fric-" tions upon the extremities, that is to ſay, upon " the arms and legs, to call off the matter." As if he had known that nature often inclined to that way of drawing off the diſeaſe, as we made it appear in that kind of this diſeaſe, which is called the colica Pictonum; in which, after the patient has ſuffered ſome violent fits of the pains, the extreme parts of the body become paralytic (as was ſaid before at the third number of the preſent aphoriſm) and fall away when the cholicky pain ceaſes, after the violence of the diſeaſe has ſettled itſelf upon the limbs of the patient.

Of Vomiting in Fevers.

SECT. DCLII.

VOMITING is a violent expulſion of what is contained in the ſtomach firſt, then in the inteſtines, and afterwards in the viſcera which empty themſelves into the latter; it owns for its immediate cauſe a convulſion of the muſcular fibres of the fauces, œſophagus, ſtomach, inteſtines, diaphragm, and abdominal muſcles; and for its remote cauſe it acknowledges every thing that ſtimulates by irritating the fibres before deſcribed, or the viſcera they compoſe, which are eaſily convulſed.

A vomiting is ſaid to attend when there is made a ſudden and violent expulſion by the mouth of what is contained in the cavity of the ſtomach; for nothing can be expelled by vomiting without coming firſt into the ſtomach, into which however it may be derived from other parts of the body. But for this expulſion of the contents of the ſtomach by the mouth to be called a vomiting, it is neceſſary for it to be violent; for that gentle and ſucceſſive expulſion of what is contained in the ſtomach in ruminating animals, does not in the leaſt deſerve to be called vomiting; no more does that riſing in the ſtomach deſerve to be thus called, whereby in many people ſome part of its contents aſcend into the mouth without any violence or nauſea, more eſpecially if the ſtomach is over-filled with food or drink. I have known

ſuch people who could at pleaſure in this manner force up a part of what was contained in the ſtomach into their mouth; and it appears alſo from the writers of obſervations, that there have been many perſons who have ruminated or chewed their food a ſecond time. Many ſuch inſtances have been collected by Peyerus [q].

By vomiting therefore there is an expulſion of what is contained in the cavity of the ſtomach, and conſequently of every thing capable of coming into the ſtomach. Galen [r] indeed has pronounced that in vomiting is diſcharged nothing but what is contained in the ſtomach itſelf, and that what is contained in the inteſtines is never diſcharged by vomiting; but direct experience proves the contrary. For both kinds of bile paſs thro' the common duct into the duodenum, and are in the mean time frequently diſcharged by vomiting: there is therefore evidently a paſſage open for the contents of the inteſtines to paſs into the cavity of the ſtomach. But the duodenum being continuous with the pylorus, is ſeated near to the ſtomach, and therefore the contents of this inteſtine may the more eaſily penetrate into the ſtomach. But it alſo appears from obſervations that the matters contained in the more diſtant inteſtines, may alſo come into the ſtomach; for when the periſtaltic motion (whereby the contents of the ſtomach are protruded into the cavity of the inteſtines, and from thence, continually drove forward, but ſlowly, through all their turnings and windings, till they are excluded by the anus) is inverted in diſeaſes, the inteſtinal fæces are in a frightful manner protruded by this retrogade motion in the ſtomach, and vomited up, as

q. De Ruminant. & ruminat. Lib. I. cap. 6. pag. 63.

r Comment. in Aphor. 12. Sect. IV. Charter. Tom. IX. pag. 139.

as Hippocrates [s] has long ago obſerved, and remarked it as a fatal ſign. Even Galen [t] himſelf acknowledges a vomiting of the fæces happens towards the end of the iliac paſſion; and therefore it is evident that we ought not to take what is alledged by Galen in ſo ſtrict a ſenſe; for he ſeems only to intend that the contents of the ſtomach might be eaſily expelled by vomiting, but that the inteſtinal contents were more difficult to diſcharge that way, and might be evacuated downward with much leſs trouble.

If therefore the contents of the inteſtines can ſometimes make their way into the ſtomach, it is very evident that all the viſcera which pour the humours ſeparated by their fabric into the cavity of the inteſtines, may afford the matter to be expelled by vomiting. But the large liver, and the ſpleen altering the blood by its fabric to be ſent to the liver, and the pancreas, evacuate themſelves into the inteſtinal tube. Moreover all the humours diſcharged into the cavity of the ſtomach and inteſtines, from the meſeraic and cœliac arteries, may be likewiſe expelled by vomiting.

It is therefore evident how manifold and copious may be the matter of vomiting. For the bile, phlegm, lymph, matter, ichor, atrabilis, *&c.* and even blood itſelf, have been ejected by vomit, as we are aſſured from the hiſtory of diſeaſes.

But the immediate cauſe of vomiting is almoſt the ſame with that of a nauſea, differing only in being a little more intenſe. But although an irritation and convulſion of the muſcular fibres of the œſophagus, fauces, and ſtomach, excite vomiting, yet theſe of themſelves do not ſeem able to

[s] De victus ratione ſanorum, Lib. III. cap. 7. Charter. Tom. VI. pag. 487. [t] De locis Affectis Lib. VI. cap. 2. Charter. Tom. VII. pag. 509.

make a total expulſion of what is contained in the ſtomach. For if we conſider with how great a force this expulſion is made when a man vomits, it will be very evident, that much more powerful cauſes are required; for the fibres of the ſtomach, however violently convulſed, cannot expel all that is contained in its cavity; ſince to do this they ought to contract the capacity of the ſtomach to nothing. When I irritated the ſtomach with the point of a knife, after opening the abdomen in a living dog, it was convulſed indeed, but yet the animal did not vomit; hence therefore the convulſion of the fibres of the ſtomach may conſpire towards the effect of vomiting, but does not of itſelf ſeem ſufficient to diſcharge all the contents. When Wepfer [u] opened the abdomen of a dog, to whom he had given mercury ſublimate, the inflated ſtomach immediately protruded itſelf through the wound, and was indeed ſometimes convulſed, but not very violently. But when he poured warm water ſeveral times through the gula into the ſtomach, the dog always threw it up again by vomit, together with froth and mucus; and he notes that the ſtomach was not very much contracted during the time of vomiting, *Virum diaphragma validè concutiebatur, ac ſi illud cum muſculis abdominis vomitum multum promoveret.* "But that the dia-" phragm was violently convulſed, as if that with " the abdominal muſcles greatly promoted vo-" miting." A like motion of the diaphragm he obſerved in vomiting in another dog, who had taken flowers of antimony [w]. For when the diaphragm, which is continuous with the ſtomach, is drawn violently downward, and at the ſame time the abdominal muſcles are likewiſe contracted, all the

[u] Cicut. aquat. hiſtor. & noxæ cap. 21. pag. 297. [w] Ibid. cap. 20. pag. 251.

the contents of the abdomen are compreſſed, and the ſtomach being interpoſed as it were betwixt two preſſes, becomes ſo powerfully ſqueezed together, that all its contents are thrown up with a great force. For the way through the pylorus is leſs open, being wrinkled and compreſſed by the abdominal muſcles convulſed; add to this, that Wepfer [x] was able to perceive in a dog vomiting, that the convulſive motion began in the duodenum, and from thence continued to the pylorus and its *antrum*; whence it is evident that the contents of the ſtomach in vomiting have not a free paſſage through the pylorus.

But that vomiting principally depends on the preſſure of the diaphragm and abdominal muſcles, is confirmed from hence; that horſes, who have the ſtomach ſeated ſo that the abdominal muſcles can have little power on it, never vomit, as the horſe-doctors unanimouſly teſtify. For in theſe animals the ſtomach, however full, does not appear upon opening the abdomen, unleſs the large colon be firſt removed, a great part of which is contiguous to the diaphragm, and fills up the greateſt part of the abdomen; for then indeed the ſtomach appears to view, deeply ſituated, and ſo remote as to be near a foot diſtant from the abdominal muſcles. It is therefore evident, that the ſtomach being placed at ſuch a diſtance from the abdominal muſcles cannot be very forcibly compreſſed by them in a horſe. But in dogs and cats, which are animals that frequently and eaſily vomit, the ſtomach is greatly expoſed to the action of the abdominal muſcles, as it likewiſe is in ruminating animals. Add to this, that the diaphragm ſeems to be of a weaker fabric in horſes; whence it has been found ſplit through its whole length, in ſuch of theſe animals, as have died ſud-

[x] Cicut. aquat. hiſtor. & noxæ, cap. 20. pag 251.

ſuddenly after too violent labour. It is alſo certain that the upper orifice of the ſtomach in a horſe is armed with a valve, which renders the return of what is contained in the ſtomach difficult; but this valve fills only two thirds of the diameter of the upper orifice of the ſtomach, and therefore cannot prevent ſome parts of the contents, at leaſt the more fluid, from being expelled that way by vomit. But yet if a very large doſe of emetic wine be given to a horſe, no vomiting enſues in this animal, even though the abdomen is obſerved to be violently contracted and convulſed after taking the medicine, which ſometimes occaſions the death of the creature. Perhaps likewiſe the ſituation of the ſtomach with reſpect to the diaphragm is ſuch in a horſe, that this muſcle alſo has very little influence upon it [y].

Yet it muſt not be denied that Wepfer [z] gives us an obſervation, which ſeems to teach that vomiting may ariſe only from a convulſion of the ſtomach. For in a puppy, to which he had given reſin of jalap, upon diſſecting the abdomen, the ſtomach burſted forth greatly diſtended; and after laying bare all the viſcera of the abdomen, he could perceive the ſtomach contract itſelf ſeveral times about its middle; and in the mean time, while Wepfer diſcovered a conſiderable lacteal canal behind the renal gland, the whelp vomited up a great quantity of frothy, mucous and grumous matter, and this even though the diaphragm was ſlit up to the gula, and was whole only on the left-ſide; from whence that author concludes that vomiting might be performed by the contraction of the ſtomach only, without the aſſiſtance of the diaphragm.

[y] Vide de his Academ. des Sciences l'An. 1733. Mem. pag. 688, &c.

[z] Cicutæ aquat. hiſtor. & noxæ, cap. 15. hiſt. 1. pag. 221.

aphragm. But if we conſider that Wepfer was intent upon other things when the whelp vomited, it will be evident he could not ſo well diſtinguiſh whether it proceeded from the contraction of the ſtomach only. Moreover, when the fibres of the ſtomach are ſo very much diſtended and convulſed, it is no wonder that they ſhould be able to expel part of the contents through the gula. Nor was there much diſcharge in this manner from the convulſion of the ſtomach, as is evident from the hiſtory itſelf which he gives us; for a little after he adds, *Ventriculo a fine gulæ ad duodenum ſecundum longitudinem ſuperne inciſo, cavitatem muco viſcidiſſimo ſpumeo & fruſtulis lacteis coagulatis plenam inventam fuiſſe.* "The ſtomach being ſlit open "longitudinally from the end of the gula to the "duodenum, its cavity appeared full of viſcid "frothy mucus, with ſmall portions of curdled "milk." From whence I think it is evident that a ſlight kind of vomiting, or rather what ought to be called a riſing or cleanſing of the ſtomach, may happen from a convulſive motion of its muſcular fibres; but that ſtrong vomiting, properly ſo called, requires a convulſion of the diaphragm and abdominal muſcles.

All this is confirmed by the appearances which we obſerve in a perſon vomiting; for firſt a nauſea is perceived, and a thin water or lymph often fills the mouth, the lower lip begins to tremble, and ſometimes the whole lower jaw; all which denote an irritation of the fibres in the fauces, œſophagus, ſtomach, *&c.* Then follows often a ſlight belching up of the contents of the ſtomach, only from a ſtrong convulſion of the ſtomach itſelf; but ſoon after the whole abdomen appears to be violently drawn inward, and the contents of the ſtomach are forcibly expelled upwards; ſo that after the

the vomiting, the whole abdomen and circumference of the diaphragm ſuffer a kind of obtuſe pain, almoſt like that which is perceived in the reſt of the limbs, after they have been tired by too much labour.

From what has been ſaid therefore the proximate cauſe of vomiting evidently appears; but the remote cauſes may be numerous and very different, though all of them agree in this, that by irritating the fibres of the forementioned parts, they ſtimulate theſe viſcera which are ſo eaſily convulſed, whether they directly act upon the viſcera themſelves, or by irritating the nervous fibres of other parts, they produce the like diſorders by conſent. A ſlight trickling of the fauces with a feather only may thus excite a vomiting, by ſuch a mechanical irritation; as may likewiſe the phlegm flowing to thoſe parts, a concuſſion or wound of the head, luxations, *&c.* concerning all which we treated under the title of nauſea. For all the cauſes producing a nauſea, if they are more violent, may likewiſe excite vomiting. In the two following aphoriſms we ſhall therefore treat of the principal remote cauſes of vomiting, ſo far as they are found in the ſtomach itſelf, or in the adjacent parts.

SECT.

SECT. DCLIII.

VOMITNIG therefore happens ſometimes from the fault of the ſtomach itſelf, convulſed, inflamed, ſuppurating, ſcirrhous or cartilaginous, joined with an acute fever, and is often very ſtubborn, being known from a knowledge of the diſeaſe itſelf, which being removed, the vomiting ceaſes likewiſe; concerning which we ſhall ſpeak more hereafter.

From the fault of the ſtomach convulſed.] Sydenham [a] has obſerved that the diſturbed motions of the vital ſpirits in hyſterical and hypocondriacal people have produced very different ſymptoms or appearances, according as they have attacked either one or the other part of the body: and that by this means almoſt every kind of diſeaſe was imitated, which might impoſe upon the phyſician, if he be not attentive and ſkilful in his profeſſion. But if this diſorder fixes upon the ſtomach, it will be convulſed, and often a profuſe vomiting will be excited, which when all other remedies have been tried in vain, has yet yielded to thoſe medicines which quiet or regulate the diſturbed motion of the nervous fluid. But concerning this we treated before at § 640, N°. 5.

Inflamed.] As the inflamed part is painful, and at the ſame time the very nervous and irritable fabric of the ſtomach is uſually ſwelled, it will be therefore greatly injured by an inflammatory tumor here formed; whence a convulſion of the fibres of the ſtomach will ſoon follow, and conſequently its uſual effect, a vo-

[a] In Diſſertatione Epiſtol. pag. 480.

a vomiting; and this more eſpecially, whenever the inflamed ſtomach is irritated, either by the ingeſted food or drink. For this reaſon a moſt painful vomiting, following immediately after taking food, is reckoned among the ſigns of inflammation in the ſtomach, as we ſhall declare more at large hereafter, at § 951.

Suppurating.] An inflammation being raiſed in any part of the body, the conſequences of that inflammation may follow, as we made appear under the title of that diſeaſe, and conſequently a ſuppuration, ſcirrhus, &c. may ſucceed. But when an inflammation tends to ſuppurate, all the ſymptoms are increaſed, and therefore it is evident that vomiting may eaſily proceed from thence. Moreover if a ſuppuration degenerates into an open ulcer, as the lips of every ulcer are almoſt conſtantly more or leſs inflamed, and ſuch an ulcer continually irritated by the ingeſted food, a troubleſome and long-continued vomiting may be therefore produced from ſuch a cauſe. Many inſtances of the ſtomach thus ulcerated, occur in the writers of obſervations; but it may be ſufficient to produce only one from Hildanus, which that faithful author had an opportunity of ſeeing himſelf. A young man of a good and ſtrong habit of body, after high living at a feaſt, was the ſame night taken with a pain in his ſtomach, at firſt indeed not very acute, but by degrees increaſing; and even ſometimes a wandering pain attacked the head, abdomen, and limbs; but a vomiting in particular attended at intervals. Every thing being tried in vain, he at length expired, after leading a calamitous life for the ſpace of eighteen months. The body being opened, a large fœtid ulcer was found in the upper orifice of the ſtomach, in the anterior part of it, where a branch of the ſixth pair of

nerves enters the ſtomach, the ulcer having penetrated almoſt into the ſtomach itſelf [b].

Scirrhous or cartilaginous.] That hard and ſcirrhous tumors have been obſerved as well in the ſtomach as in the other viſcera, was ſaid before at §. 484. and when theſe are preſent, and eſpecially if they begin to be malignant by compreſſing and irritating the adjacent parts, they may excite vomiting and many other bad ſymptoms. But the worſt of all theſe tumors are thoſe ſeated near the pylorus, obſtructing the diſcharge of the food contained in the ſtomach into the inteſtines, for then there happens a continual vomiting. Two ſuch caſes were communicated to the celebrated Spon [c], from which it appears that the pylorus itſelf was ſcirrhous, and almoſt cartilaginous, and that a continual vomiting attended for ſeveral weeks before death.

But all theſe diſorders are increaſed when the vomiting before-mentioned is accompanied with an acute fever, for thereby the inflammation, if it pre-exiſted, will be increaſed, or at leaſt one will be raiſed, if there was not any before, ſince the humours agitated by the fever, irritate the adjacent parts, which ſurround theſe tumors of the ſtomach.

But an obſtinate vomiting always attends from theſe cauſes, becauſe by the endeavour itſelf to vomit the inflammation of the ſtomach is augmented; and a ſchirrus before dormant, and of a mild nature, lodged in thoſe parts, often degenerates into a malignant cancerous diſpoſition. But when the vomiting ariſes from phlegm, bile, or the like, irritating the ſtomach by their weight or ſtimulus, when theſe are evacuated, either ſponta-

neouſly

[b] Hildan. Obſerv. Centur. 3. Obſervat. 20. [c] Harder. Apiar. obſerv. 62. pag. 250.

neouſly or by art, the vomiting is eaſily allayed. But now as theſe cauſes of the vomiting are more eaſy or difficult to remove, ſo will the cure or removal of the effect or vomiting ſucceed or not.

But what methods are to be taken for the cure of an inflammation of the ſtomach, and the ſeveral ways in which it may terminate, will be explained hereafter under a diſtinct title. At the ſame time it is alſo evident from what has been ſaid, why a vomiting is ſometimes incurable, namely, when the ſcirrhous tumors have acquired a cartilaginous hardneſs, and continually irritate the ſtomach.

SECT. DCLIV.

A Vomiting may again proceed from a fault in the viſcera and circumjacent parts, affected in like manner as the ſtomach before, and irritated by the ſtomach diſtended with food; and from hence a very obſtinate vomiting frequently happens without any manifeſt cauſe, accompanied by a fever.

It is well known that the natural ſituation of the ſtomach is ſuch, that the greateſt part of it is covered by the incumbent liver, while on the left ſide it is covered by the ſpleen itſelf; behind it is ſeated the pancreas, while the colon lies in contact with its fundus, &c. But it was ſaid before in the Comment to § 648, that the ſtomach is ſo eaſily irritable, that only by roughly touching its external ſurface with a pair of pliers, it is brought into convulſions, and this even in a dead animal by pricking it with the point of a knife. If therefore the like diſorders happen in thoſe parts contiguous

guous to the ſtomach, as we enumerated them in the preceding aphoriſm, it is ſufficiently evident that the moſt obſtinate vomiting may thence ariſe, even though there is no diſorder of the ſtomach itſelf, nor any thing injurious lodged in its cavity. But the parts contiguous to the ſtomach preſs upon it ſo much more in proportion, and they will be ſo much more violently affected, as the ſtomach is more diſtended, and therefore vomiting ariſing from a diſorder in the circumjacent parts near to the ſtomach, is commonly the worſt when that organ is diſtended with food: therefore this ought always to be thought of in every obſtinate, chronical vomiting and a careful inquiry ſhould be made, whether the ſigns denote this or that viſcus to be affected, that thus ſuitable remedies may be adapted to remove the vomiting, if the cauſe of it is curable, or at leaſt that it may be alleviated; and at the ſame time care muſt be taken not to make bad worſe by a perverſe method of cure, as frequently happens when ſuch diſorders are irritated by vomits or purges. There are indeed very numerous obſervations in medical hiſtory, which prove an obſtinate vomiting to have proceeded from a diſorder of the parts circumjacent or contiguous to the ſtomach. A youth of eighteen years old had the enſiform cartilage preſſed inward by a blow, which by irritating the ſtomach produced frequent vomiting; but in vain was this vomiting attempted to be cured by various medicines, 'till at length the cartilage was reſtored to its proper place by a ſkilful hand [d]. If now only ſuch a mechanical irritation from the diſplacing of this cartilage could produce a continual vomiting, will not the like happen when a ſcirrhous liver, or pancreas, preſſes upon the ſtomach in the ſame manner? That

[d] Academ. des Sciences l'An. 1737. hiſt. pag 67.

That a nauſea and vomiting happen from an inflammation of the liver, was ſaid before at § 642. N°. 3. When the gall-blader is turgid with bile, while its excretory duct is obſtructed from any cauſe, after the moſt ſevere anguiſh follows profuſe vomiting of a long duration, until the bile is repelled and returned into the blood by the violent ſpaſms of the diaphragm and abdominal muſcles, and diſcolours the whole body yellow as in a jaundice. When a ſtone in the kidney has ſlipped from the pelvis into the narrow part of the ureter, a vomiting enſues only by the mechanical irritation from it; and it is indeed a ſalutary endeavour of nature, while by theſe violent concuſſions ſhe endeavours to propel the ſtone from the ureter into the cavity of the bladder. Vomiting likewiſe follows from an inflammation of the inteſtines in the iliac paſſion, in ſtrangulated ruptures, &c. as the obſervations both of antient and modern phyſicians unanimouſly teſtify. That the like effect will follow from ſuppurating tumors in the ſame parts is evident enough, and that all theſe diſorders will increaſe if a fever attends.

From all which it is ſufficiently evident how careful we ought to be in ſearching after the cauſes of vomiting, in order to make a ſafe cure; and it likewiſe appears to be ſometimes neceſſary not to ſuppreſs the vomiting, namely when, by the violent concuſſions in that operation, the offending matter lodged in the viſcera is rendered moveable or expelled, as we obſerve in patients troubled with calculi, the jaundice, or a fluctuating atrabilis, &c. The beſt remedy in that caſe is to render vomiting leſs troubleſome by a plentiful drinking of ſome thin liquor; for when the ſtomach is empty, the ſtrainings to vomit very much fatigue the patient. It likewiſe appears from what has

been ſaid that vomiting is ſometimes incurable, when the viſcera contiguous to the ſtomach being invaded with a ſcirrhous or cartilaginous tumor, preſs upon and irritate it: and in this diſorder there is only one method of relief, namely the taking in food and drink by ſmall quantities at a time, that the ſtomach might not to be much diſtended.

SECT. DCLV.

AND laſtly, a vomiting may proceed from all the cauſes increaſed which excite a nauſea (§ 642); from whence therefore diſorder is to be diſcovered, and the curative indications are to be directed.

For a nauſea (as is evident from what we ſaid before at § 642.) acknowledges almoſt the ſame cauſes as vomiting, only more ſlight; and therefore an increaſe of theſe will cauſe vomiting. Even vomiting frequently follows a nauſea, and a nauſea almoſt conſtantly precedes every vomiting. But every thing which has been ſaid to be the cauſes of nauſea, diſtinguiſhed into five claſſes, may ſerve to this. But that the cure of a vomiting muſt be proſecuted in the ſame manner as that of a nauſea proceeding from the ſame or ſlighter cauſes, is what no one doubts.

SECT. DCLVI.

IF the vomiting continues it occaſions an atrophy or waſting of the whole body, the iliac paſſion, convulſions, and the effects of a great and obſtinate nauſea, § 643.

We come now to ſee what diſorders are to be feared from vomiting, in order to form thence a prognoſis. The matter which is thrown up by vomiting deſerves to be here conſidered, becauſe the prognoſis often varies as that differs. Hippocrates [e] obſerves that vomiting is the moſt uſeful, when the matter expelled conſiſts of bile and phlegm both together, and not very thick; but a vomiting of the ſimple humours unmixed he pronounces to be worſe. He condemns a livid porraceous or blackiſh matter, thrown up. And if the perſon vomits a humour of all thoſe colours, he obſerves it is fatal. He likewiſe pronounces a humour diſcharged ſubputrid and of a foul colour bad; and that ſpeedy death is denoted, if the matter vomited up is livid and ill ſmelling. Moreover, if the vomiting continues, all the nouriſhment taken into the body is expelled, and conſequently it will be waſted with a true atrophy for want of nouriſhment. But if the vomiting returns at long intervals, it may be often ſupported for a long time, ſince as yet a ſufficient quantity of chyle is derived from the food and ſent into the blood. I have ſeen ſome of theſe caſes in which the inteſtinal tube being contracted in ſome part, or compreſſed by an adjacent ſcirrhous tumor, the free courſe of the ingeſted aliment has been intercepted; from whence after three or four days time

[e] In Prognoſticis Charter. Tom. VIII. pag. 638, 639, 640.

time a vomiting has enſued, preceded with ſevere anguiſh, by which means every thing was expelled that had been taken into the body all that time, and after this the patient has found himſelf very well, and has had an appetite to food, 'till after the like interval of time being almoſt elapſed, the vomiting has returned. Tulpius[f] has an obſervation of a vomiting of all the food that was taken in during the ſpace of about ten months in a virgin, but without any manifeſt loſs of ſtrength; but afterwards being troubled with a vomiting of the chyle, ſhe periſhed before the eighteenth month of the diſeaſe. Perhaps ſhe might have ſupported the vomiting longer, but the concomitant and continual fever, loſs of ſpeech, profuſe menſtrual diſcharge, and other moſt grievous maladies, accelerated the ſlow-paced death. Many more hiſtories are to be found in the writers of obſervations, by which it appears that ſuch periodical vomitings have been often ſupported a long time together, when by this means the body was not wholly deprived of nouriſhment.

Iliac paſſion.] Sydenham[g] very well remarks that the violent vomitings which uſually happen in the beginning of fevers have ſometimes been the occaſion of the iliac paſſion. But he diſtinguiſhes two kinds of this diſeaſe, according as it proceeds either from an obſtruction of the inteſtinal tube, or an irritation. The firſt he calls the baſtard kind, and the latter the true iliac paſſion; and the laſt he ſays happens when the tumultuous blood by the fever depoſits ſharp malignant humours in the ſtomach and adjacent inteſtines, which by irritating their ſenſible membranes invert the periſtaltic

[f] Obſervat. Med. Lib. II. cap. 22. pag. 133.
[g] Sect. I. cap. 4. pag. 89, &c.

motion, and throws up the offenſive matter by the mouth. This inverted motion of the ſtomach takes place next in the duodenum, and afterwards throughout the whole tract of the inteſtines; ſo that the periſtaltic motion, whereby the aliments are naturally propelled downward, is here inverted, and occaſions a regurgitation of the inteſtinal contents into the cavity of the ſtomach to be expelled by vomiting. But he obſerves that the ſtomach leads the van in a vomiting that proceeds from an inverſion of the periſtaltic motion, and that therefore the principal aim of the cure ought to be levelled againſt the irritation of the ſtomach to remove it.

Convulſions.] Vomiting itſelf has for its cauſe a convulſion of the muſcular fibres of the fauces, œſophagus, ſtomach, inteſtines, diaphragm and abdominal muſcles; as we ſaid before at § 652. It is therefore no wonder if by theſe repeated convulſions the whole nervous ſyſtem ſhould be diſturbed, as was demonſtrated before upon another occaſion in the comment to § 233, ſo as to excite convulſions in other parts of the body: more eſpecially as the nerves, diſperſed through the ſtomach, inteſtines and meſentery, have ſo great an influence upon all the other nerves of the body; as is evident from what we ſaid before. Moreover, as the body is exhauſted by frequent vomiting, there may be danger of convulſions from this inanition of the veſſels (ſee § 232). Hence Hippocrates is afraid of convulſions from the ſtrong vomit of hellebore; and he alſo condemns convulſions and hiccups from a vomiting of healthy humours.

But now all the diſorders following a long-continued nauſea, are deſervedly ranked among the

effects

effects of an obſtinate vomiting, concerning which we ſpoke before at § 643 [h].

If now we alſo conſider that all the contents of the abdomen are violently compreſſed, while the diaphragm and abdominal muſcles are convulſed, the venal blood will thence be drove with a great force and velocity towards the right ventricle of the heart; and from the ſame action likewiſe, the arteries, leading to the lower parts of the body, and diſperſed through the abdominal viſcera, will be compreſſed: It will be thus evident that the arterial blood is derived more copiouſly and impetuouſly towards the upper parts of the body, while at the ſame time the reſpiration being obſtructed during the vomiting, the right ventricle of the heart cannot freely diſcharge its blood into the pulmonary veſſels: Hence the return of the venal blood from the head is impeded, while in the mean time a great quantity is ſent up by the large arteries. There is therefore the greateſt danger, leſt by a long continued vomiting ſome of the ſmall veſſels of the encephalon ſhould burſt, and a fatal apoplexy be produced by the extravaſated humours compreſſing the brain; an accident which, we are aſſured, often happens in ſtraining to vomit, by numerous inſtances in medical hiſtory. But moreover, if no rupture of the veſſels ſhould happen, yet the ſoft pulp of the encephalon may be compreſſed by a diſtenſion of the blood-veſſels, and in conſequence of that many diſorders may enſue. But if we conſider the alterations which happen in the act of vomiting, it will be ſufficiently apparent that there are juſt grounds to fear all theſe maladies. For at that time the face looks ſwelled and red, the eyes are watery and ſuffuſed with blood,

[h] Coac. Prænot. N°. 565. Charter. Tom. VIII. pag. 885.

the jugular veins appear turgid or ſwelled, and the eyes obſerve ſparks of light and variety of colours, the ears ring, the objects ſeem to turn round, and a vertigo or giddineſs, and ſometimes a dulneſs and ſleepineſs continues upon the patient for a while after violent vomiting. From hence it is evident how dangerous vomiting is to bodies plethoric and turgid with ill humours; and how juſt it was in Sydenham [i] to inculcate that if the patient's condition required bleeding and vomiting, the former ought always to precede the latter, leſt by the violent ſtrainings to vomit, the veſſels of the lungs ſhould burſt, or the brain itſelf be injured by the powerful affuſion, and perhaps effuſion of the blood, of which he affirms he has obſerved ſome inſtances. And from hence it is alſo evident, why Celſus [k] pronounces vomiting very improper for thoſe who have a weak or diſordered head.

Moreover, as all the abdominal viſcera are violently compreſſed in the act of vomiting, and the lungs with the upper parts of the body are diſtended with a great quantity of blood; if any of the viſcera are diſſolved or weakned by chronical diſeaſes, a rupture of them, and the very worſt conſequences, are to be feared: and therefore from this cauſe has been frequently obſerved a fatal over purging, or a diſcharge of blood upward or downward, when the liver being firſt corrupted has been broke by the violent ſtrainings to vomit. Thus I ſaw a woman who was diſcoloured by a chronical jaundice, and by taking a vomit, ſhe fell into an over-purging, whereby a great quantity of putrid foul matter was diſcharged by ſtool, and afterwards pure blood followed with faintings, ending ſoon after in death. Who would have ever believed that the tube of the œſophagus could be broke by violent endea-

[i] Sect. I. cap. 4. pag. 35. [k] Lib. I. cap. 4. pag. 43.

endeavours to vomit, if this had not been seen by Boerhaave himself with his own eyes in the body of the illustrious high-admiral of our republic (as we said before in the comment to § 170. N°. 5) Herniæ or ruptures are likewise frequently observed to arise from vomiting, and even a great change has been found in the natural situation of the viscera after long continued vomiting, as was said before upon another occasion in the comment to § 169. Celsus [1] therefore justly pronounces, concerning vomiting, where he condemns the custom of those who endeavoured to allay a voracious appetite by daily vomiting: *Itaque istud luxuriæ causa fieri non oportere confiteor: Interdum valetudinis causa recte fieri, experimentis credo. Commoneo tamen, ne quis, qui valere & senescere volet, hoc quotidianum habeat.* "Therefore (says he) I must "confess that vomiting ought not to be excited "for the sake of luxury; but that it may be "sometimes rightly performed for the sake of "health, I am induced to believe from experi- "ence. But I advise those, who would live in "health, and to an old age, not to make use of "daily vomiting."

SECT. DCLVII

IF the cause of the vomiting arises from some of those defects before-mentioned (§ 653, 654) the cure is to be derived from the history of those diseases.

The cure of vomiting depends entirely upon the remote causes, by which the muscular fibres of the fauces and œsophagus, &c. (see § 652) or the other viscera, very apt to be convulsed, are irritated.

[1] Lib. I. cap. 3. pag. 29, 30.

tated. Therefore no general method of cure can here take place, but a careful inquiry is neceſſary to be made after the cauſes. But if the vomiting ariſes from a fault in the ſtomach itſelf, its ſubſtance being diſeaſed either by an inflammation, ſuppuration, ſcirrhus, &c. (§ 653) or from the like diſorders occupying the adjacent viſcera or other parts (§ 654), the cure of the vomiting ought to be derived from the hiſtory of thoſe diſeaſes, concerning which we ſhall treat hereafter under the head of inflammatory diſeaſes of the viſcera.

SECT. DCLVIII.

IF the vomiting proceeds from the cauſes before-mentioned (§ 653, 655) then ought the ſame remedies (§ 644) to be diligently called into uſe, more eſpecially opiates and corroborating epithems, with atractives and diſcutients.

Concerning all theſe we treated under the title of nauſea; where we firſt diſtinguiſhed the ſeveral cauſes of loathing into five claſſes, and afterwards delivered the proper method of curing each. But it ſometimes happens, that acrid and putrid bilious humours, or thick viſcid matters, fluctuate in the ſtomach, or are collected in the adjacent parts; and though theſe have been expelled by emetics, or purgatives, yet vomiting immediately enſues from the ingeſted food, becauſe the ſtomach is then rendered too ſenſible, and is too eaſily irritable after ſo many repeated convulſions in frequent vomiting. In that caſe opiates which allay all thoſe tumults, and obtund too ſharp a ſenſe of the ſtomach,

mach, are here of the greateſt uſe, as are likewiſe all ſuch things as are capable of changing the too great impetuoſity of the ſpirits towards theſe parts, and of directing them other ways. For theſe purpoſes is recommended the celebrated antiemetic medicine deſcribed by Riverius[m], compoſed of a ſcruple of ſal abſinthii mixed with a ſpoonful of lemon-juice and ſwallowed; for when theſe come into the ſtomach an efferveſcence ariſes, by which a wonderful ſtimulus is excited in the nerves of the ſtomach, which happily removes the ſpaſms and convulſions of it. But it is very evident that this remedy does not act ſo much by expelling or correcting the matter contained in the ſtomach and inteſtines, but only by changing and directing the impetus of the nervous fluid upon theſe parts. But concerning the uſe of opiates we treated before at § 644, N°. 5.

On the ſame account thoſe remedies will be uſeful which corrobrrate the ſtomach, over-weakened by theſe violent concuſſions, as was there ſaid; whence alſo after vomiting, if the ſtomach is infirm, Celſus[n] adviſes cold water to be drank, bread to be eaten that was baked the day before, to drink ſtrong rough wine, and to eat roaſted meats and the moſt drying food of all kinds. Many ſuch forms, whereby a languiſhing and weak ſtomach may be relieved after long continued vomiting, are furniſhed in the *Materia Medica* of our author correſponding to § 644, where they were employed for the cure of a nauſea ariſing from the ſame cauſes. But alſo epithems, fomentations, or cerates compoſed of the like ingredients, and applied externally to the region of the ſtomach, are of the greateſt uſe; forms of which may be likewiſe ſeen in

[m] Prax Medic. Lib. IX. cap. 7. pag. 415. [n] Lib. I. cap. 3. pag 39.

in the place laſt cited. Theriaca Andromachi ſpread upon leather, and applied to the epigaſtrium, is commonly very uſeful, on account of the beſt ſpices and opium, of which laſt it contains a large quantity. Cupping-glaſſes applied to the region of the ſtomach without ſcarification are likewiſe uſeful for the reaſons beforementioned at § 630, N°. 3.

SECT. DCLIX.

HENCE the reaſon is evident why it is ſo difficult to ſuppreſs vomiting in many acute fevers, and hence likewiſe appears the falſity and danger of the rule which aſſerts that vomiting is cured by vomiting; why frequently ſudorifics remove vomiting, as in the plague; and why the vomiting frequently ceaſes when a criſis happens in the ſmall-pox? why it is frequently relieved by bleeding, as in acute inflammatory diſeaſes: why thoſe who have a continual vomiting in the beginning of an acute fever not proceeding from inflammatory cauſes, have a critical diarrhæa towards the end, which might have been prevented by giving an emetic in the beginning of the diſeaſe? why a vomiting of every thing immediately after it was taken into the body, is one of the very worſt ſigns in acute diſeaſes? Hence likewiſe it appears that hiccups may ariſe from the ſame cauſes, and be cured by the ſame means.

From

From what has been hitherto ſaid concerning vomiting, the following corollaries may be derived.

The reaſon is evident why it is ſo difficult to ſuppreſs, *&c.*] For frequently in acute fevers there is an inflammation of the ſtomach, inteſtines, or other viſcera incumbent on the ſtomach; and from this inflammation a vomiting enſues, which therefore cannot be allayed, unleſs the cauſe of the vomiting itſelf is removed, which frequently cannot at all be done, or with great difficulty. It is likewiſe evident from what was ſaid in the hiſtory of wounds of the head, that the brain, being injured by concuſſion or compreſſure, is followed with a vomiting of eruginous bile: and therefore likewiſe when the functions of the encephalon begin to be greatly diſturbed in inflammatory diſeaſes of the head, ſuch a vomiting attends and cannot be removed, unleſs the inflammation there ſeated can be firſt cured. Hence that ſaying of Hippocrates mentioned before in the comment to § 267: *In capitis doloribus æruginoſi vomitus, cum ſurditate & pervigilio, cito vehementer inſanire faciunt.* "In pains of the head, vomitings of eruginous "bile, with deafneſs and overwatching, theſe "ſoon cauſe the patient to be violently delirious." But alſo the atrabilis, which has lain a long time fixed and immoveable, oppreſſing the abdominal viſcera, being diſſolved and put into motion from any cauſe, kindles the moſt acute fevers, and among other ſymptoms of the worſt kind produces a nauſea and vomiting (ſee § 1104.) not to be allayed unleſs the turgid atrabilis can be removed, or ſo corrected as to be leſs injurious; which how difficult it is to perform, will appear when we come to treat hereafter of this diſeaſe.

Fal-

Falſity and danger of the rule, &c.] This has indeed been eſteemed by many as an univerſal axiom or rule in practice; that whenever there is a vomiting and nauſea in diſeaſes, it is always uſeful to promote a vomiting by art, believing that they then always endeavour to diſcharge the matter of the diſeaſe by the ſame ways which are inclined to by nature. And what confirmed them in this opinion, is the happy ſucceſs they have met with in this practice, when the vomiting ariſes from the troubleſome quantity or the acrimony of the bile or fluctuating phlegm in the firſt paſſages. But, from what has been ſaid, it is evident that a moſt obſtinate vomiting ſometimes ariſes from an inflammation, ulcer, ſcirrhus, or cancer in the ſtomach itſelf, or in the circumjacent parts. But it is eaſily apparent, that emetics, given in ſuch caſes, muſt greatly exaſperate all the diſorders. Thus alſo in a vomiting which proceeds from a diſturbed motion of the nervous fluid, this rule is falſe, ſince emetics being given increaſe the diſturbance. But Hippocrates [o] has very prudently limited this rule, by ſaying that vomiting is to be allayed by vomiting, when the matter which excites a vomit is waſhed out together with the emetic.

Why ſudorifics often remove vomiting, as in the plague?] This has been obſerved by Sydenham, that a moſt ſevere vomiting often attends thoſe ſeized with the plague, whereby the medicines given were immediately expelled; and therefore in ſuch a caſe he abſtained from giving medicines, till he had raiſed an incipient ſweat only by the weight of bed-cloaths; for, ſays he, *Nam cum materiæ morbificæ radii verſus ambitum corporis ſeſe exporrigant, ilico alvi fluxus & vomitiones, ab eiſdem*

[o] De locis in homine cap. 15. Charter. Tom. VIII. pag. 374.

eiſdem introrſſum reflexis, ac in ventriculum & inteſtina decumbentibus provenientes, ultro ſedantur[p]: "When the morbific matter extends itſelf in radii "towards the circumference of the body, imme- "diately the vomiting and purging ceaſe, which "proceeded from the ſame reflected inward, "and extending into the ſtomach and inteſtines." But ſo certain was Sydenham of his being able to allay ſuch a vomiting by exciting ſweats, that when an apothecary's brother lay very ill of a peſtilential fever, and had taken the ſtronger ſudorifics without effect, immediately throwing them up again by vomit, he nevertheleſs promiſed that he would eaſily take off his vomiting, though every thing taken before would not ſtay upon the ſtomach. But in the end he fulfilled his promiſe, for when the patient began to be in a moderate ſweat only by the weight of bed-cloaths, he ſwallowed and retained a large bolus of theriaca, and, by a copious ſweat continuing, the patient was cured of the diſeaſe. But when a ſweat once begun was interrupted by any cauſe before the matter of the diſeaſe was perfectly expelled, all the ſymptoms immediately returned worſe than before.

Why vomiting often ceaſes when a criſis happens, as in the ſmall-pox?] The contagion of the ſmall-pox being received into the body, often excites its tragical effects firſt about the ſtomach: this is evident from the anxiety and pain of the upper orifice of the ſtomach, which is perceived about this part, with a nauſea and vomiting, which ſo frequently attend in the firſt ſtage of this diſeaſe. All theſe diſorders uſually continue through the whole ſtage of infection, till the received poiſon begins to be depoſited towards the ſurface of the body by the fever, ſo as to produce inflammatory

[p] Sydenham Sect. II. cap. 2. pag. 153, 154.

tory puſtules, tending to abſceſs or to gangrene. Then indeed all the ſymptoms uſually diminiſh, and the hitherto troubleſome vomiting ceaſes, there being a critical depoſition of the poiſoning ſtimulus, and of the humours changed by it, towards the outer ſurface of the body. But when a vomiting continues after an eruption of the ſmall-pox, it denotes that the puſtules then invade the internal ſurface of the ſtomach and œſophagus itſelf, or elſe that the ſtomach is irritated by the bile, rendered acrimonious by the violent fever preceding; concerning which we ſhall treat more at large hereafter in the hiſtory of the ſmall-pox.

Why vomiting often ceaſes by bleeding, as in acute inflammatory caſes?] Becauſe in theſe diſeaſes the vomiting frequently ariſes from an inflammation of the ſtomach or adjacent viſcera, or only of the brain itſelf. But that blood-letting is a principal remedy to remove the inflammation, is evident from what was ſaid before concerning the cure of that diſorder. In the comment to § 644. N°. 3. mention was made of a remarkable caſe of a noble lady lying ill of an acute fever, to whom Sydenham gave an emetic to remove an urgent vomiting, which he had experienced to be uſeful in ſo many other vomitings: but he ingenuouſly confeſſed, that he there obſerved the error he had committed; and afterwards in others afflicted with the like fevers, he treated this vomiting by bleeding, as in a pleuriſy, and with very happy ſucceſs.

Why in the beginning of an acute fever, &c.] Becauſe then the ſtomach is almoſt conſtantly irritated by the bile abounding, or rendered more acrid; which bile being rendered more malignant by ſtagnating and by the fever, being conveyed

into the inteſtines excites a diarrhæa towards the end of the diſeaſe, which is often dangerous, as the patient's ſtrength being greatly weakened by the preceding diſeaſe, renders him incapable of ſupporting any copious evacuation. This obſervation holds true, more eſpecially in that kind of continual fever, which frequently occurs in autumn, and in that epidemical conſtitution which particularly favours the invaſion of intermitting fevers. But ſince intermitting fevers are oftener epidemical than other diſeaſes, ſo the continual fever which prevails at that time, is obſerved to be more frequent than the reſt, as Sydenham [q] well remarks. Nor was it without reaſon that this great man, comparing together all that he had learnt concerning epidemical conſtitutions, by a faithful obſervation continued for many years, concludes [r], that this was the chief fever in nature, becauſe it occurred more frequently than the reſt; and becauſe the axioms which the antient phyſicians have left us concerning the criſes of diſeaſes, agree more with theſe than with any other fevers, as we obſerved in the comment to § 587, where we treated of criſes. But alſo autumnal intermittents which uſually invade together with theſe continual fevers, are of the like nature; and double tertians and even quartans, when the fits have been protracted and doubled, often turn into ſuch a continual fever [s], as on the other hand that fever ſometimes turns itſelf over to the claſs of intermittents [t]. Hence Sydenham [u] juſtly concludes that the forementioned continual fever is as it were a ſort of compendium of thoſe autumnal intermit-

[q] Sect. I. cap. 3. pag. 57. [r] Ibid. Sect. V. cap. 6. pag. 317. [s] Ibid. Sect. I. cap. 4. pag. 68. [t] Ibid. pag. 73. [u] Sect. I. cap. 3. p. 56.

tents, as on the other hand every fit of the intermittent ſeems to be a ſort of compendium of the continual fever, and the difference he places chiefly in this, that the efferveſcence once begun in the continual fever, always holds out in one continued courſe to the end: but that intermittents run the ſame courſe in broken periods at different times. Hence it is evident how extenſive this practical rule may be, ſince it takes place as well in thoſe acute continual fevers which the moſt frequently occur, as in the intermittents, which are ſo frequently epidemical. For I have obſerved, that when theſe fevers occur moſt frequently in theſe low countries, a vomit given in the beginning of the intermittent or acute fever has been of great ſervice: although, as Sydenham well remarks [w], an emetic given in the beginning of theſe diſeaſes has brought up a matter not very conſiderable in quantity, nor endowed with any apparent bad quality. But when a vomit is given in the progreſs of the diſeaſe, after being neglected in the beginning of it, there is often a great collection of foul, bilious matter expelled; and in the mean time the patient is thereby greatly relieved, the fever going on frequently through its courſe quietly without any troubleſome ſymptoms, and that fatal diarrhæa is thus always prevented, which ſo frequently ſucceeds in the end of theſe diſeaſes. The only difficulty then will conſiſt in diſtinguiſhing well whether the cauſe of the fever is inflammatory or not; towards which the ſeaſon of the year, the known epidemical conſtitution of the diſeaſe, and a faithful obſervation of the juvantia and lædentia will afford conſiderable light. For ſuch diſeaſes prevail moſtly about autumn; but the ſpring, and the next ſucceeding part of the ſummer is more apt

[w] Sect. I. cap. 4. pag. 65.

apt to produce inflammatory diſeaſes. But what care is neceſſary to diſtinguiſh in theſe caſes is evident, ſince Sydenham himſelf, who was ſo well ſkilled in theſe things, ingenuouſly confeſſes he was deceived, as we ſaid a little before.

Why a vomiting of every thing as ſoon as taken, &c.] For it almoſt conſtantly denotes that the ſtomach itſelf, or the contiguous diaphragm, or elſe the adjacent viſcera, are invaded with a violent inflammation; whence theſe parts are ſo much irritated by the leaſt repletion of the ſtomach as to excite a vomiting, by which theſe inflamed parts being roughly preſſed, there is great danger leſt the preſent inflammation ſhould ſuddenly turn into a fatal gangrene. At the ſame time alſo ſuch a vomiting is of very bad conſequence, inaſmuch as it prevents the uſe of diluent and cooling liquors, a great quantity of which is neceſſary in the cure of ſuch diſeaſes.

Hence likewiſe it appears that hiccups, &c.] A hiccup ſeems to be a convulſion, wherein the œſophagus, ſtomach and diaphragm are drawn upward, and then again the diaphragm is ſuddenly convulſed downwards [x], for which ſee more in our author's Theoretical Lectures or Inſtitutes, § 808. For the appearances which are obſerved in a perſon who has the hiccup, ſeem to declare this, and after a long continued hiccup there is uſually a troubleſome uneaſineſs perceived about the fauces and upper orifice of the ſtomach. But this convulſive motion happens ſo ſwiftly that one cannot exactly determine what parts are in action; whence Sydenham [y] ingenuouſly confeſſes that he could not ſatisfy himſelf upon enquiry concerning the cauſe of hiccups. But it ſeems evidently enough to conſiſt

[x] Herm. Boerhaave Inſtitut. Medic. § 808. [y] Sect. I. cap. 4. pag. 86.

in a convulsive motion of the œsophagus. This is confirmed by Hippocrates [z], who derives a convulsion and hiccup from the same causes, where he says, *Convulsio aut a repletione aut ab inanitione fit: ita vero & singultus.* "A convulsion proceeds either from repletion or inanition; and so "does likewise a hiccup." And elsewhere [a] he often joins a hiccup and convulsion together; as when he says, *Effuso copioso sanguine convulsio aut singultus accedens malum.* "A great quantity of blood "being extravasated, if it is followed by a con- "vulsion or hiccup is a bad sign." And in the aphorism next following, *Hypercatharsi convulsio aut singultus accedens, malum.* "That a convulsion "or hiccup succeeding after an over-purging is "bad." But since a vomiting and nausea acknowledge for their immediate cause a convulsion of the muscular fibres in the fauces, œsophagus, stomach, &c. therefore vomiting seems also to result from nearly the same causes, and may be cured by the same means, which were prescribed for the cure of a nausea and vomiting: for it arises almost from the same causes as a vomiting: and it is frequently a companion of an inflammation in the stomach, as we shall declare hereafter at § 951.

Hippocrates [b] observes that an inflammation of the liver is attended with a hiccup; and in another place, he says, that both vomiting and hiccups proceed from the iliac passion [c]. Very frequently do we observe hiccups arise from an inordinate motion of the spirits in hysterical patients, which is to be cured by allaying the tumult, or directing the spirits another way; which effect often happily succeeds by irritating the nerves in some other part of the body, or by quieting the hiccup by giving an opi-

[z] Aphor. 39. Sect. VI. Charter. Tom. IX. pag. 273.
[a] Aphor. 3. Sect. V. ibid. pag. 195. [b] Aphor. 58. Sect. V. ibid. pag. 230. [c] Aphor. X. Sect. VII. ibid. pag. 296.

opiate. Hippocrates obſerves that ſneezings following in a perſon afflicted with the hiccup, removes the hiccuping by changing the courſe of the nervous ſpirits, (which before ruſhed with too great an impetus into the fibres of the œſophagus,) by irritating the nerves diſperſed through the noſe. Diaſcordium given in a large doſe, which we know contains opium, happily cures the hiccup; as we are aſſured by Sydenham [e], that he has experienced it when the ſeeds of dill and other famous ſpecifics have been of no ſervice.

If therefore the hiccup ariſes from the cauſes which we enumerated among thoſe of nauſea and vomiting, the cure is to be derived from what has been ſaid before. If the hiccup ariſes from a too ſudden evacuation, as it frequently does in old people after a diarrhæa, and eſpecially after vomitings, as Sydenham [f] obſerves, thoſe evacuations are to be ſuppreſſed, and the loſt humours ſupplied by laudable nouriſhing juices. But if the hiccup proceeds from too great a fulneſs, then evacuations will be ſerviceable.

Moreover, hiccuping frequently follows when the interior ſurface of the œſophagus is irritated by the maſs of food and drink ſwallowed and ſuddenly forced down. Thus voracious children, when they greedily eat what they have ſtole privately, are uſually affected with a hiccup. The ſame diſorder likewiſe proceeds frequently from the ſwallowing of any thing very acrid. But the moſt frequent and troubleſome of all hiccups ariſes, when the œſophagus is invaded with apthæ, or little ulcerations; and frequently the phyſician knows that theſe ulcerating eruptions begin to break out in the œſophagus, from the hiccuping which attends, and this even before they begin to appear in the fauces or internal parts of the mouth.

[e] Sect. I. cap. 4. pag. 87. [f] Ibidem.

But when the apthæ fall off, we frequently ſee the tongue and fauces in a manner excoriated, whence they become extremely painful if they are touched with the ſlighteſt acrimony; and the ſame thing likewiſe then happens to the internal ſurface of the œſophagus, ſo that a moſt painful hiccuping follows almoſt from every thing that is ſwallowed, and frequently even from the ſaliva itſelf; for the cure of which hardly any thing is found better than the ſwallowing a little freſh expreſſed oil of almonds every hour, which by its healing virtue happily eaſes and defends the excoriated gula.

Of

Of Weakneſs in Fevers.

SECT. DCLX.

GREAT weakneſs follows from an obſtructed influx and preſſure of the nervous fluid into the muſcles.

Concerning weakneſs of the ſolid fibres of the body, as alſo of the ſmaller and larger veſſels and viſcera, which they compoſe, we treated at large in the beginning of theſe aphoriſms; where it appeared that a weakneſs in theſe fibres is properly ſuch a ſmall coheſion of the parts which conſtitute the ſolids, as may be broke by a ſlight force, ſo as to render them incapable of the actions required from them towards life and health (ſee § 41). But here, by a febrile weakneſs we underſtand an impotency in exerciſing the motion of the muſcles, which depend upon the influence of the will, as when a patient lying ill of a fever can hardly raiſe or turn his body, or move the limbs, even though he endeavours it by the influence of the will, and although there is no impediment from pain in the parts to be moved. For thoſe who are afflicted with the gout or rheumatiſm are indeed prevented from moving their limbs by the ſeverity of the pains, but they are not therefore ſaid to be weak. But ſince in every febrile patient there is a weakneſs attends the exerciſe of the muſcular motions, which can never be performed by them with ſo much eaſe, pleaſure, and conſtancy, as happens in health; therefore in this place we treat only of an extraordinary or great

weakneſs as a febrile ſymptom, requiring in a peculiar manner the care and attention of the phyſician. Great weakneſs is therefore ſuch an impotency in the exerciſes of the muſcular motions, as renders them neither conſtant nor eaſy, but yet ſo as to be in ſome meaſure ruled by the influence of the will. For where there is a total impotency of exerciſing theſe motions, which cannot be conquered by any endeavours of the will, it is called a palſy, which is to be well diſtinguiſhed from a weakneſs, however great that may be. Moreover, a palſy does not deſtroy the action of all the voluntary muſcles at once, but a great weakneſs uſually affects all the muſcles equally; although it is more or leſs perceived in one part than in another, according as the muſcles ought to exert a greater or leſs force when they act. Thus even the weakeſt perſon will be able to move his lips, eyes, fingers, *&c.* when he cannot extend his arm, raiſe his body, or turn himſelf round in the bed; becauſe to perform this more and ſtronger muſcles are required to act at the ſame time.

But it is evident from the demonſtrations given concerning muſcular motion in our inſtitutes or theoretical lectures, that the cauſe of motion is ſometimes preſent in, and abſent from the muſcle, and therefore that it is derived to it from ſome other part, and is not always preſent in the muſcle itſelf. It likewiſe there appears by direct experiments that a free communication is required betwixt the encephalon and muſcles to be moved by the intermediate nerves, in order that the cauſe of motion may be applied to the muſcles; for this communication being intercepted by a ligature of the nerve leading from the encephalon to the muſcle, there can then be no motion excited in ſuch a muſcle. But from what we at preſent know by ana-

anatomy, concerning the fabric of the encephalon, we may conclude that a moſt thin fluid is tranſmitted from the encephalon through the nerves by very diſtinct paſſages to every muſcle, even though this fluid by its great tenuity eſcapes all the ſenſes, and flows through veſſels ſo minute, that they cannot be demonſtrated to the eye by any artifice[g]. It is therefore evident, that the weakneſs concerning which we here treat follows from an obſtructed influx and preſſure of the nervous fluid into the muſcles. But this preſſure of the nervous fluid into the voluntary muſcles, proceeds from the influence of the will; for as ſoon as we will or endeavour to move any limb, it is inſtantly in motion without any ſenſible interval of time betwixt the endeavour of the will, and the effect which it produces. But in what manner this power in the mind, of exciting the motion of the muſcles by the will, acts upon the firſt origin of the nerves, and there increaſes the quantity and celerity of the nervous fluid about to flow through the nerves, remains indeed unknown to us; ſince there is not the leaſt reaſon to be given, from what we as yet know concerning the nature of the body and mind, whereby one may underſtand the means through which theſe two act mutually upon each other, or ſuffer mutually the one from the other[h]. Moreover, this endeavour of the will may be preſent even in the weakeſt perſon, and yet not be followed with its due effect; and therefore the cauſe of this weakneſs muſt be a deficiency of the very thin nervous fluid, or an obſtruction of its free courſe from its origin through the nerves into the muſcles.

It is indeed true that experiments teach us likewiſe that an artery being tied, before its diſtribution

[g] Vide de his H. Boerhaave Inſtitut. § 284.
[h] Ibid. § 27. 1.

tion into a muſcle, deſtroys the motion of that muſcle; but the influx of the arterial blood ſeems only to be required to put the muſcle in a capacity of being affected by the moving cauſe to be derived from the encephalon through the nerves into the muſcle. Therefore the influx of arterial blood into the muſcles does not ſeem to be the proximate cauſe of their motion, but only diſpoſes the muſcle to be put in motion by the acceſſion or influx of the nervous fluid through the nerves. For our will has no influence whereby it can directly accelerate the influx of the arterial blood into any muſcles; and when a muſcle is in violent action its fleſh looks pale from an expulſion of all the blood. Moreover, if there is a deficiency of arterial blood in the body, which is followed by too languid a motion of it, to which any one would willingly aſcribe the febrile weakneſs, yet it is certain that the influx of the nervous ſpirits into the muſcles is alſo deficient in proportion. For the ſecretion of the nervous fluid and equable motion of it through the medulla of the brain and nerves, require the application of the arterial blood, with a due force and quantity to the cortical fabric, whence the ſame effect will follow.

It now remains for us to ſee what are the cauſes that have been obſerved to obſtruct the influx and preſſure of the nervous fluid into the muſcles, ſo as to produce great weakneſs in fevers.

SECT.

SECT. DCLXI.

WHICH obſtruction may proceed from an emptineſs of the veſſels exhauſted f their fluids, an imperviouſneſs of the fluids, n obſtruction of the nervous tubes, or a com- reſſion of them, more eſpecially at their ori- in in the brain and cerebellum; or laſtly, from weakneſs of the heart.

From an emptineſs of the veſſels exhauſted of heir fluids.] The motion of our fluids through he veſſels proceeds from two cauſes, namely the eart impelling the blood into the converging ar- eries, and diſtending them; and afterwards the eaction of the arteries, whereby they reſiſt dilata- ion and contract themſelves again at the time when the heart is dilating. But that quantity of he blood, which is projected out of the ventricles f the heart into the arteries, would not be ſuffi- ient to dilate them even in the moſt remote parts f the body, unleſs the arteries were already full at he time when the blood is impelled into them by he contraction of the heart. When therefore there s ſo great a loſs of the fluids that the ſides of the rteries, when they are moſt contracted, do not come into contact in every point with their con- ained fluid; in that caſe the blood expelled from he heart would fill the arteries without dilating hem, and the moment after when the heart is di- ating, the arteries could not contract, becauſe they were not dilated; and therefore the blood con- tained in their cavities would ſtagnate and not be ſent forward, 'till by repeated actions of the heart it had expelled a ſufficient quantity of blood to fill

them, ſo as to be dilated by the next ſyſtole of the heart. The natural motion therefore of the humours through the veſſels being thus weakened, there will be a deficiency of the quantity of the blood to be propelled through the veſſels of the encephalon, the preſſure will be diminiſhed whereby the fluids are urged into and through the ſecretory veſſels in the cortical part of the brain; and conſequently there will be a deficiency in the ſecretion of the ſpirits, and their equable motion through the nerves, whence weakneſs muſt neceſſarily follow. The truth of this appears from daily obſervation; for when the ſtrongeſt man or the moſt fierce animal has ſuffered ſo great a loſs of blood from a wound that the arteries begin to want their due fulneſs, they immediately languiſh and fall into great weakneſs.

From an imperviouſneſs of the fluids or an obſtruction of the nervous tubes.] A fluid is ſaid to be impervious, when it cannot paſs freely through the ultimate ſmall extremities of the veſſels in which it is contained; whether or no this happens from the viſcidity of the liquid by which its cohering particles do not ſuffer themſelves to be eaſily ſeparated, that they may paſs through the ultimate extremities of the veſſels; or whether the orifices of the ſmaller veſſels being dilated, make way for the larger globules to enter into them by an error of place, which being incapable of paſſing through thoſe ultimate extremities, the effects in both caſes will be the ſame as from an imperviouſneſs of the liquid. The veſſels therefore which contain an impervious liquid will be obſtructed, becauſe the bulk of the particles to be tranſmitted, exceed the capacity of the tranſmitting canal (ſee § 107); whence all theſe functions will be aboliſhed or diſturbed, which depend upon a free circulation

of the humours through thoſe veſſels. But the ſecretion of the nervous ſpirits, and the motion of them through the nerves, depends on a free circulation of the humours through the veſſels of the encephalon; whence it is evident that weakneſs in fevers may ariſe from an impervioufneſs of the fluids, and an obſtruction of the veſſels thence following. Hence in acute inflammatory diſeaſes, when the blood being deprived of its diluent vehicle paſſes more difficultly through the extremities of the arteries, there often enſues ſo great a weakneſs; and this more eſpecially, if the violence of the diſeaſe ſettles upon the head, and the impervious blood begins to ſtagnate in the veſſels of the encephalon. For the ſame reaſon there is a weakneſs of the body often attends in a cold mucous cacochymy, when the ſluggiſh and viſcid humours cannot paſs through the narrow ſtreights of the cortical veſſels of the encephalon; whence a numbneſs, dulneſs, and incapacity to exerciſe the motions of the muſcles.

Or a compreſſion of them, more eſpecially at their origin in the brain and cerebellum.] In plethoric people great weakneſs often ariſes from this cauſe, though there is no defect either in the ſolid or fluid parts of the body, only there is a redundancy or too great a quantity of good blood. For the cranium is always exactly full, as appears when the upper part of the ſkull is taken off together with the dura-mater in a dead body; for then the maſs of the encephalon immediately raiſes itſelf, and the top of his ſkull cannot be adapted again without compreſſing the brain. If therefore there is too great a quantity of red blood, as there is naturally no red blood ever found in the cortical part of the encephalon, but it is confined only to the veſſels of the dura and pia mater, thoſe veſſels being

being diſtended ſince the ſkull cannot give way the ſoft pulpy fabric of the cortex will be compreſſed. But as there are arteries found containing red blood diſperſed betwixt the medullary ſubſtance of the brain itſelf, and great numbers of them encompaſs the medulla oblongata; it is evident that from this cauſe the tender threads or tubuli of the nerves may be ſo compreſſed at their very origin in the brain and cerebellum, that from thence the due influx and preſſure of the nervous fluid into the muſcles may be impeded, and conſequently a weakneſs may follow. But becauſe the ſubſtance of the brain is ſofter than that of the cerebellum, therefore from ſuch a cauſe the functions of the former upon which depend the action of the voluntary muſcles, will be firſt injured. Thus we often find thoſe who are very plethoric are alſo very weak; but after a copious blood-letting they immediately recover their former ſtrength of body. The ſame conſequence will likewiſe take place, when the impetus of the blood rarefied by heat and increaſed by the fever thus diſtends the veſſels, though there is not too great a quantity in general. But if from the ſame cauſes ſome of the veſſels being burſt extravaſate their humours, and compreſs the ſubſtance of the encephalon, it is very evident that the diſorder is ſtill more dangerous. From this cauſe the moſt fierce bull by a blow on the ſkull immediately falls down, and loſes all his ſtrength. Hippocrates[i] ſeems to have acknowledged the ſame cauſe of weakneſs, when he ſays, *Qui præter rationem, nulla exiſtente vaſorum inanitione, proſtratis ſunt viribus, malum.* "That in thoſe who have a loſs of "their ſtrength without any manifeſt cauſe, and "not from any inanition of the veſſels, it is a bad "ſign."

[i] In Coac. Prænot. N°. 56. Charter. Tom. VIII. pag. 855.

"ſign." And in another place[k], *Quibus capitis & cervicis dolores, atque totius corporis cum tremore imbecillitas quædam, ſanguinis eruptiones ſolvunt.* "That eruptions of blood remove pains of the "head and neck in thoſe who have a trembling "and weakneſs throughout the whole body." It is now ſufficiently apparent that weakneſs may ariſe from any cauſe compreſſing the brain, whether it conſiſts in a dilatation of the veſſels, or in a collection of humours in the ventricles or ſome other part of the brain. A remarkable inſtance of this we read in Le Motte[l] of a woman who received a ſlight contuſion of the head towards the left eye, with a fracture of the adjacent temporal bone, almoſt without any pain or other bad ſymptom, ſo that the injury appeared but ſlight with an ecchymoſis in the contuſed part. In about eighteen days time after the accident, the ecchymoſis being now wholly diſſipated, nor any diſorder as yet perceived, the patient began to grow weak, and in two days more had her memory impaired, and ſpoke inconſiſtently; afterwards the weakneſs continually increaſed, tho' ſhe eat much, and all the functions of the brain were more and more weakened, till ſhe expired, after the ſpace of two months. Upon opening the body there was found a white and turbid ſerum lodged pretty deeply in the cortical ſubſtance of the brain next to the medulla, and that part of the brain where this ſerum was lodged, diſſolved or broke to pieces by the leaſt touch.

Or laſtly from a weakneſs of the heart.] Every one knows that the heart is truly a muſcle, acting with a muſcular force upon the blood contained in its cavities, and expelling the ſame powerfully into the arteries. But to enable it to perform this, it requires

[k] Prædict. Lib. I. ibid. pag. 800. [l] Traitè complet de Chirurgie Tom. II. pag. 580, &c.

requires a due ſtrength in its muſcular fleſh; for when the heart in its contraction urges the blood forward, it ought to be able to overcome the reſiſtance of the arteries already full; and then the ſides of the heart are preſſed with the ſame force by the contained blood, as is equal to the force implied by the heart in propelling the blood through the arteries. There is therefore required a conſiderable ſtrength in the muſcular fibres of the heart, that they may not be ſtretched beyond their due length. If therefore from any cauſe the due coheſion of the fibres of the heart is weakened, while the reſiſtances to be overcome remain the ſame, there will happen a greater diſtraction or elongation of theſe fibres, whence their coheſion once weakened will be ſoon increaſed, and the cavities of the heart will be enlarged. But when the reſiſtances are increaſed, though the fibres of the heart retain their firſt ſtrength, they muſt ſuffer a greater force, in conſequence of which they will be more ſtretched, and ſo farther weakened (ſee § 25. N°. 3.) We treated more at large upon this ſubject, and confirmed what we advanced by the moſt faithful obſervations of the beſt authors; when upon another occaſion we diſcourſed concerning an aneuriſm of the heart (ſee § 176.) which always ſuppoſes a weakneſs and ſtretching of the fibres in the heart. It appears, from many inſtances in medical hiſtory, that the heart has been ſometimes eroded by ulcers, and by that means weakened in its ſubſtance; and the right ventricle of the heart appeared burſt from ſuch an ulceration and eroſion upon opening the body of the illuſtrious Duke of Brunſwick[m]. But there is an obſervation much more ſurprizing given us in the ſame place by the celebrated Morand, who ſearching after the cauſe of

[m] Academ. des Sciences l'An 1732. Mem. pag. 594.

of ſudden death in the body of a certain nobleman could find nothing amiſs either in the head or in the abdomen, and the lungs appeared ſound: but in opening the pericardium there appeared a maſs of congealed blood, and in the left ventricle a perforation, which was equal to eight lines in length; and the fleſhy ſubſtance of the heart appeared ſo infirm, that the probe made its way through in every part by its own weight, which, though ſmall, was ſufficient to make it paſs quite through the heart. If therefore the ſtrength or firmneſs of the muſcular fleſh in the heart may be ſo much diminiſhed by latent cauſes, there is no room to doubt but it may be weakened from ſlighter diſorders of the ſame kind, whereby it will not be able to propel the blood into the arteries. But upon this force of the heart depends the application of the arterial blood to the fabric of the encephalon, together with the ſecretion of the ſpirits through the nerves thereon depending; and therefore it is no wonder if a weakneſs of the heart impedes the influx and preſſure of the nervous fluid into the muſcles, which is followed with great weakneſs.

But may we not refer to the forementioned cauſes of weakneſs many other wonderful appearances obſerved in diſeaſes? There is ſometimes a matter lodged about the præcordia, which, as it were by a poiſoning force, in a moment ſuppreſſes all the ſtrength, and occaſions great weakneſs as long as it continues there, even though there has been no preceding loſs of the fluids, nor any obſervable change to be found either in the ſolid or fluid parts of the body, to which the ſuddenly produced weakneſs might be aſcribed. Galen[n] has obſerved not only convulſions, but even a ſyncope to follow

[n] De locis affectis, Lib. V. cap. 6. Charter. Tom. VII. pag. 493.

from bile lodged about the præcordia, and upon diſcharging that matter by vomiting, all the maladies immediately ceaſed. In continual fevers which ſpread epidemically, Sydenham [o] was ſurprized to find, among other bad ſymptoms, a great and ſudden weakneſs of the patient's ſtrength; but after giving a vomit, all the ſevere ſymptoms which tortured the patient, and terrified the by-ſtanders, were directly mitigated [p]. But ſometimes the greateſt weakneſs has been obſerved, when poiſons being taken have been lodged in the ſtomach only, as is confirmed by many inſtances in Wepfer's hiſtory of the cicuta aquatica. But they do not all ſeem to act in the ſame manner by rendering the liquids impervious, or by obſtructing the veſſels, becauſe all theſe maladies ceaſe immediately as ſoon as they are diſcharged out of the ſtomach. Whether or no by altering the nerves of the ſtomach they act directly upon the heart itſelf? or whether the cerebellum is firſt affected, which ſerves to the vital functions of the body? It is ſufficient for us here to be acquainted with theſe wonderful effects, though we do not underſtand the manner wherein ſuch a weakneſs ſuddenly ariſes from the like poiſons; and it will be alſo ſerviceable at the ſame time to know this, leſt the weakneſs from ſuch a cauſe ſhould be aſcribed to others.

[o] Sect. I. cap. 3. pag. 57.
[p] Ibid. cap. 4. pag. 65.

SECT.

SECT. DCLXII.

THE former cauſe of weakneſs is demonſtrated from the previous and preſent ſymptoms of profuſe evacuations; ſuch as the long continuance of the diſeaſe, an artificial or morbid hæmorrhage, ſweats, diabetes, ſpitting, or a diarrhœa; a deficiency in the taking in, retaining, digeſting, and diſtribution of the food; a paleneſs, leanneſs, ſmall pulſe, collapſed veſſels, and flaccid muſcles.

Since therefore a weakneſs may ariſe from ſo many different and even oppoſite cauſes, it is altogether neceſſary, in order to accompliſh a cure regularly, to learn firſt from what cauſe the weakneſs derives it origin. The ſigns are therefore to be enumerated whereby the cauſe of the preſent weakneſs in the body may be diſtinguiſhed from others. But in the preſent aphoriſm we are to treat of thoſe ſigns which denote the weakneſs to be aſcribed to an emptineſs of the veſſels, and waſting of the fluids.

In the firſt place, hitherto belong large evacuations of any kind, which, while preſent, appear to the ſenſes; but, when they have preceded, they are to be learnt from the hiſtory of the diſeaſe. Moreover, by large evacuations of any kind the body is altered, and appears with a different face externally to what it had before; ſo that from theſe changes being obſerved, one may alſo judge ſuch evacuations have preceded. But concerning each of theſe we are next to treat.

Long continuance of the diſeaſe.] It is well known that, by the vital motion of the humours

through the veſſels, even moderate and healthy, the ſolid parts of the body are ground away, and the quantity of the fluids leſſened; whence is required a reſtitution of what is loſt by taking in food and drink to be ſo changed by the powers of the veſſels and viſcera of the body, as to be converted into our own nature. But when the vital motion is accelerated by a fever, a much greater quantity will be daily waſted from the body, inſomuch, that fat people, afflicted with a continual fever, have often loſt half their weight in a fortnight's time. At the ſame time alſo many of thoſe functions are injured by the fever, which ought to change the food into our own nature; whence the aſſimilation or reſtitution of what is loſt will be either deficient or diſturbed. It is therefore evident, that a weakneſs, following after a diſeaſe of long continuance, proceeds principally from this cauſe, and is to be cured by ſuch things as are able to repair the loſt ſolid and fluid parts.

Morbid or artificial hæmorrhages.] To make a due ſecretion of the nervous fluid in the brain and cerebellum, and to continue its preſſure into the muſcles, requires a due quantity or impetus of the arterial blood to be ſent into the arteries of the encephalon. When therefore the quantity of the blood is greatly diminiſhed by hæmorrhages, either ſpontaneous, or procured by art, it is evident that weakneſs muſt follow. When we treated of thoſe remedies (§ 610.) whereby too great an impetus of the vital humours might be allayed in a fever, it appeared that blood-letting was moſt fit for this purpoſe, by which the ſtrength might be weakened to any degree; for even in the moſt healthy and ſtrongeſt perſon this evacuation may be continued ad deliquium, or 'till the patient faints with great weakneſs. How great a weakneſs often ariſes from

from ſuch an hæmorrhage, when by miſcarriage, or in women with child, the veſſels of the uterus are broke, and pour forth their blood in a ſtream, we are taught by daily obſervation. The great ſtrength of raving mad perſons I have thus known ſo much weakened by bleeding, that they have not been able to move their limbs; whence the madneſs was indeed relieved, but an incurable fooliſhneſs ſucceeded in its place. The weakneſs ariſing from the hæmorrhage is ſtill more increaſed, becauſe the due aſſimilation of the ingeſted food is hindered by the too great loſs of blood. (See §. 25. N°. 1. §. 43. N°. 3.)

Sweats.] What diſorders may ariſe in diſeaſes from profuſe ſweats, has been in part declared at §. 594. N°. 2. and will be partly ſhown hereafter, when we come to treat profeſſedly of a febrile ſweat. It may be ſufficient here to obſerve, that as the thinner parts of the blood are exhaled by ſweating, what remains will be inſpiſſated; whence the equable circulation through the ſmalleſt veſſels of the encephalon will be diſturbed, and conſequently the ſecretion of the nervous fluid and its preſſure into the muſcles will be impeded. Alſo by ſuch a profuſe evacuation by ſweats, the fluids are too much exhauſted, and the veſſels emptied; whence *Ægineta* [q] obſerves, that exceſſive ſweatings ſo much weaken and fatigue the patient, that they frequently bring on a fainting. But profuſe ſweats, as Sydenham [r] well obſerves, often ariſe from the powers of the body weakened after diſeaſes of long continuance, and, as long as they laſt, prevent the patient from recovering ſtrength after the diſeaſe.

Diabetes.] An unfrequent diſorder which Galen [s] affirms he had only twice ſeen; and tells us it

[q] Lib. II. cap. 46. pag. 22. verſa.
[r] Sect. V. cap. 2. pag. 291.
[s] De Locis affectis, Lib. VI. cap. 3. Charter. Tom. VII. pag. 511.

was looked upon as a ſort of miracle from its ſo ſeldom occurring amongſt mankind. *Araeteus*[t] will have it ſo called ἀπὸ τῦ διαβαίνειν, becauſe there is a very ſwift paſſage of the fluids through the body. Galen[u] obſerves that it hath been called *hydrops ad matulam*, an urinary diarrhœa, and *dipſicus*. The Latins have not given it a peculiar name, but have only called it too great a flux or profuſion of the urine[w]. But Galen ſeems to call it by the name of a diabetes, when the ingeſted drink ſuddenly paſſed through the body unaltered by urine; for thus he expreſſes himſelf: [x] *Equidem eum bis vidi, ſupra modum ſitientibus infirmis, atque idcirco affatim bibentibus, celeriterque per urinam reddentibus epotum tale, quale biberant.* "I "have indeed ſeen this diſeaſe twice, the patient "being more than ordinary thirſty, and therefore "drinking plentifully they quickly diſcharged "what was drank by urine juſt as it was taken "in." Ægineta[y] likewiſe gives the following definition of a diabetes. *Diabetes eſt ſubitus potulentorum exitus, talibus per urinam redditis, qualia epota fuerant.* "A diabetes is a ſudden diſcharge "of liquors drank, which are voided by urine, "ſuch as they were taken in by the mouth." But in this ſenſe a diabetes frequently occurs; for in acute inflammatory diſeaſes it is often of the worſt preſage, when the drink taken in is very ſoon expelled by urine little altered. But Celſus[z] calls it too

[t] Morbor. diuturn. Lib. II. cap. 2. pag. 51.

[u] De Locis affectis, Lib. 6. cap. 3. Charter. Tom. VII. pag. 511.

[w] Celſ. Medic. Lib. IV. cap. 20. pag. 234.

[x] De Locis affectis, Lib. VI. cap. 3. Charter. Tom. VII. pag. 511.

[y] Lib. 3. cap. 45. pag. 47.

[z] Medic. Lib. IV. cap. 20. pag. 234.

too great a profuſion of the urine, *cum ſuper potionum modum mingitur, & jam ſine dolore profluens maciem & periculum facit*; "wherein the patient "makes more water than what he drinks, which, "coming away without pain, cauſes leanneſs and "danger of death." From whence it is evident, that not only the ingeſted drink is thus expelled from the body in a diabetes, but alſo other humours eſcape by theſe paſſages, and waſte the body. Hence Aretæus [a] ſays, that the cauſe of the diabetes is a cold and moiſt diſſolution or waſting of the fleſh and limbs by urine, and that though the thirſt is intollerable, and a great quantity of liquor is drank, yet the quantity of the urine exceeds that of the drink. But although a diabetes is an unfrequent diſeaſe, yet that degree of it, which Aretæus [b] calls perfect, is above all the moſt ſeldom to be met with: namely, when the urine is diſcharged in a continual profuſion without any intermiſſion, whence a ſpeedy waſting and death enſues.

We may therefore diſtinguiſh a twofold diabetes, one wherein a great quantity of thin urine is diſcharged, equalling or even exceeding the drink taken in: the other is indeed an increaſed quantity of urine, but at the ſame time the thicker humours eſcape with it; whether they ariſe from a colliquation of the parts of the body, or from the chyle or milk prepared from the ingeſted aliments flowing with the blood, and diſtilling together with the urine through the renal ducts; the latter is commonly with more propriety termed a diabetes by Phyſicians, namely, a frequent and copious diſcharge of a milky or chylous urine [c].

a Morbor. diuturnor. Lib. II. cap. 2. pag. 51.
b Ibidem.
c Herm. Boërh. Inſtit. Med. § 824.

This diſtinction has been already given us by Celſus [d], who divides too great a profuſion of the urine into thin and thick. The former kind of diabetes, in which there is diſcharged a great quantity of thin urine, is more frequent, and ſeems to be leſs dangerous; becauſe frequently ſuch a copious diſcharge of the urine ſupplies the deficiency of the ſanctorian perſpiration; and medicinal hiſtory acquaints us, that people have ſometimes ſupported it for a long time without much damage. Cardan [e] teſtifies of himſelf, that for forty years of life he was afflicted with ſuch a copious diſcharge by urine, inſomuch that he diſcharged from ſixty to an hundred ounces every day; nor yet did he fall away, nor was he troubled with any great thirſt. The latter kind of diabetes, wherein a great quantity of urine is diſcharged together with chyle or milk, is leſs frequent, as the body is thereby deprived of its nouriſhment, and muſt conſequently waſte away. But although the chyle or milk flowing together with the blood does not ſeem naturally to paſs through the renal ducts, yet it is not very unuſual to find ſome ſuch appearance in the urine even of healthy people. I have ſometimes ſeen in myſelf, ſome hours after a meal, and eſpecially after hard walking, and having firſt eaten a large breakfaſt, that my urine, which appeared turbid and milky almoſt the moment that it was evacuated, immediately after depoſited a white ſediment, very much like chyle. And I have ſince ſometimes obſerved the ſame kind of urine in others. Galen [f] ſeems to have ſometimes obſerved a like matter in the urine, which he calls a crude

[d] Lib. IV. cap. 20. pag. 234.
[e] De Vita propria, cap. 6. Tom. I. pag. 5.
[f] De Alimentor. facultat. Lib. I. cap. 2. Charter. Tom. VI. pag. 311.

crude juice; concerning which he has the following passage: *Crudus autem succus propriè dictus talis est, quale id apparet, quod in urinis quandoque subsidet, puri adsimile; verum pus graveolens est & glutinosum. Crudus vero succus illi crassitie & colore tantum est similis, quum neque graveolens sit, neque lentus. Non tamen febricitantibus solis ex crudorum humorum copia in urinis subsidet, cujusmodi dixi, sed & sanis, qui post multos exantlatos labores cibos duros & confectu difficiles comedunt.* "But the crude juice properly so called is such as "that appears and sometimes subsides in the urine, "resembling pus or matter; but matter is glu- "tinous and ill-smelling, whereas this crude juice "resembles it only in colour and consistence, "being neither viscid nor of a bad smell. But "such a juice, as that before mentioned, subsides "in the urine not only in those who abound with "crude humours in fevers, but even in healthy "people, who eat food hard and difficult to di- "gest, after they have been exhausted with much "labour." Now, according to the greater or less quantity of the chyle circulating with the blood which this way escapes, the body will fall away sooner or later; but those who retain a sufficient quantity of chyle, and have a strong appetite, often support the disorder for a long time, as may be seen in the observations which Schenckius[g] and others have collected. But now every thing capable of relaxing the renal ducts, or of causing the humours to flow towards the kidneys with a greater quantity and impetus, may be the cause of this disease. Hence we read in the writers of observations, that it has been produced by too much of watery drinks, and from the more acrid diuretics.

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[g] Lib. III. pag. 454.

The cure therefore will principally conſiſt in rendering the too lax renal veſſels more firm, by avoiding drink as much as poſſible, and taking only thoſe of the ſtronger kind. By keeping the whole ſurface of the ſkin lax and very perſpirable, and if the patient is ſtrong enough, by uſing exerciſe of body 'till the ſweat begins to appear: for we know that by ſweats the quantity of the urine is diminiſhed; whence people who labour hard in the ſummer-heats drink a great quantity of ſmall beer, and often diſcharge very little by urine; becauſe in theſe almoſt the whole quantity of ingeſted liquor is carried of from the body by ſweating. Cold is to be ſtrictly avoided, becauſe by that a great quantity of the humours is derived to the kidneys, as it diminiſhes the cutaneous exhalation. By theſe means I have been able to cure a gardener of this diſeaſe, making uſe at the ſame time of a drying regimen of diet, and applying woollen cloths, moiſtened with oxycrate, to the region of the kidneys. But he indulged himſelf much in ſleep, and did not go to his uſual labour 'till long after the ſun was riſen, being equally cautious likewiſe to avoid the evening-cold; but by exerciſing himſelf ſo much the harder in his daily labour, he made up for that loſs of time. But it required three months time before this diſeaſe could be wholly removed, even though it was but mild at firſt, returning again ſometimes within that ſpace. But all theſe particulars agree very well with what is recommended by Celſus [h] for the cure of this diſeaſe, when he ſays, *Opus eſt exercitatione & fricatione, maximeque in ſole vel ad ignem. Balneum rarum eſſe debet, neque longa in eo mora: cibus comprimens: vinum auſterum meracum; per æſtatem, frigidum; per hiemem,*

[h] Lib. IV. cap. 20. pag. 234.

iemem, egelidum, ſed tantum, quantum minimum-t, &c. *Vitanda omnia ſunt, quæ urinam movere onſueverunt.* " There is need of exerciſe and ' frictions, more eſpecially in the ſun or be- ' fore the fire. Warm bathing ſhould be ſeldom ' uſed, and then the patient is not to ſtay long in ' it: the food is to be aſtringent, and the wine ' ſhould be rough and ſtrong, drank cold in the ' ſummer, and in the winter with the cold taken ' off, but not ſo much as to warm it; every thing ' is likewiſe to be avoided which uſually promotes ' urine."

Spitting.] How much the body may be exhauſted only by a diſcharge of the ſaliva, we are taught from a ſalivation raiſed by mercury: for by this means even a fat perſon is in a few weeks time perfectly emaciated. In the ſmall-pox, more eſpecially of the confluent kind, there is often a great quantity of humours diſcharged this way from the body. And very frequently in thoſe who are troubled with thick and large apthæ, when they fall off, a copious ſpitting enſues, becauſe the veſſels dilated under the apthous cruſt being ſet at liberty when the ſcab falls off, a great quantity of lymph pours forth from their open mouths, whence great weakneſs follows: and frequently ſuch patients are loſt, unleſs the profuſe ſpitting can be reſtrained, as the ſtrength has been uſually much exhauſted by the diſeaſe.

Diarrhœa.] How many different kinds of liquors may be this way carried off from the body, and how the whole habit may be drained by it, we ſhall declare hereafter at §. 719. It is ſufficient here to obſerve, that thereby a very great quantity of the humours may be evacuated, and conſequently a weakneſs brought on.

A deficiency of the food taken in, retained, &c.] For to keep up the ſtrength, as we have often ſaid before, requires a reſtitution from the ingeſted food and drink of thoſe parts, which have been waſted from the body by the daily actions of life and health. If therefore from bad advice nouriſhment is neglected to be given to the patient (ſee §. 602); or if the patient ſhould not be able to ſwallow it, as in a quinſy, weakneſs may enſue; as it alſo may if the ingeſted food is not retained, but diſcharged out of the body, either by vomiting or diarrhœa, before chyle can be prepared from thence. But ſince the ingeſted aliments do not nouriſh until they have been firſt changed by the powers of the body (ſee the comment to §. 1) it will not be ſufficient barely to take in and ratain the foods, but a due digeſtion of them is alſo required, which, being deficient, will be likewiſe attended with weakneſs. But ſince the chyle is prepared by the efficacy of the ſtomach and inteſtines, joined with the mixture of the ingeſted liquors, it ought to be capable of entering the ſmall mouths of the lacteal and meſenteric veins to mix with the blood, and be farther elaborated by the action of the veſſels and viſcera; and this is called the abſorption and diſtribution of the chyle or food. If therefore the entrance of the chyle, formed from the ingeſted aliments, into thoſe veſſels is obſtructed, either from a glutinous matter collected in the firſt paſſages, and adhering to the ſides of the inteſtines (ſee §. 71), or from apthæ ſeated throughout the whole tract of the primæ viæ, there will be a deficiency of the nutrition, and conſequently a weakneſs will follow.

Paleneſs, leanneſs, &c.] All theſe are the ſigns by which we know that the veſſels are empty by being exhauſted of their fluids; for ſuch changes happen

appen apparently in the external habit of the body
n thoſe who are weak from this cauſe. For pale-
eſs denotes a deficiency of the red blood, and
eanneſs a waſting of the fat; a ſmall pulſe, and
ollapſed veſſels, demonſtrate a ſcarcity of the hu-
nours diſtending the larger conſpicuous arteries
nd veins. The muſcles, which are ſo large in
trong people, being exhauſted of their fluids, be-
ome ſmall and flaccid in thoſe who are weak, be-
auſe the fluid diſtending their vaſcular ſubſtance is
o greatly diminiſhed; and this more eſpecially,
ecauſe the fat interpoſed betwixt the muſcular
ibres is alſo waſted, though it is upon this chiefly
hat the bulk of the muſcle depends. For al-
hough in conſumptive people before death, the ha-
it of the body appears ſo far waſted, that only
he dry ſkin ſeems to be left hanging upon the
ones, yet they are able to exert the motions of their
muſcles; and therefore the muſcular fibres pro-
erly ſo called remain entire, although all the
at being conſumed which was interpoſed betwixt
hoſe fibres, makes the bulk of the muſcles appear
ncredibly ſmall. Galen[i] very well remarks this
when he ſays, *Singularum partium ſubſtantiæ molem*
x tali maximè compleri natura, quæ & perire &
egigni poteſt, uti in cavis ulceribus manifeſtè videre
icet. "That the bulk or ſubſtance of every part
'is made up chiefly by nature of ſuch matter as
'may be both waſted and regenerated, as one
'may plainly perceive in hollow ulcers." When
herefore ſuch changes appear in the external habit
of the body, we may be certain that the preſent
weakneſs of the patient ought to be aſcribed to
nanition of the veſſels.

[i] Method. Medend. Lib. X. cap. ultim. Charter. Tom. X.
ag. 245.

SECT.

SECT. DCLXIII.

AN imperviouſneſs of the fluids from glutinous or inflammatory tenacity, i known from the ſigns before given (§. 69 t 75.)

There is more eſpecially a twofold viſcidity ob ſerved in our fluids, by which they are rendere impervious: The one which ariſes from a defici ency or inactivity of the vital motion, which is uſu ally accompanied with coldneſs, paleneſs, and leu cophlegmatic ſwelling of the body; the othe proceeds from an increaſed circulation and violen action of the veſſels upon their contained fluids, by which the humours being rendered too denſe an compact, paſs more difficultly through the ultimate extremities of the veſſels: And this laſt is called an inflammatory viſcidity or tenacity, which i more eſpecially denoted by a heat and redneſs o the body. Concerning the former we treated under the title of diſeaſes from a ſpontaneous glutinoſity in the aphoriſms cited in the text; and it is very rare that weakneſs in fevers ariſes from that cauſe, because bodies full of ſuch ſluggiſh and glutinous humours are leſs inclined to fevers, more eſpecially ſuch as are acute; and in theſe the impetus of the vital motion being increaſed in the fever, often happily diſſolves that cold lentor. But the latter is much more frequently the cauſe of weakneſs in fevers: and often ſuch a lentor is produced by the fever itſelf, though it did not pre-exiſt; or if it was preſent before the fever, it will be increaſed thereby, as is evident from what has been ſaid in the commentaries to §. 100, 587, 609. But this

inflam-

inflammatory impervioufneſs is more eſpecially diſcovered by the ſigns enumerated before §. 382, 384, and 385.

SECT. DCLXIV.

BUT the weakneſs ariſing from an obſtruction of the veſſels may be known from what has been ſaid on this ſubject, from §. 107 to 144.

Concerning this we have treated in the hiſtory of obſtruction under the aphoriſms cited by theſe numbers.

SECT. DCLXV.

THE cauſe of weakneſs ariſing from a compreſſure of the brain and cerebellum, is known from what is obſervable in their functions injured at the ſame time, which functions we know for certain depend upon the entire or healthy ſtate of theſe viſcera; ſuch are a delirium, ſleepineſs, trembling, vertigo, or ringing in the ears attending at the ſame time.

As the brain is leſs firm than the cerebellum, cauſes compreſſing the fabric of the encephalon generally act more powerfully and ſooner upon the brain than upon the cerebellum, as we obſerved before in the comment to §. 661. For it ſeldom or never happens that the vital powers are weakened by a compreſſure of the cerebellum, but that the animal functions appear firſt injured from the

the brain being more eſpecially affected in the ſame manner. For the cerebellum is furniſhed with no cavity wherein humours might be collected ſo as to compreſs that only; and then the fourth ventricle of the encephalon, as it is called, which lies under the cerebellum, cannot be ſo filled as to compreſs the cerebellum, without affecting the medulla oblongata in the ſame manner, which containing the medullary fibres both of the brain as well as the cerebellum, therefore the functions of the former will be injured by it as well as the latter. But that compreſſure, which ariſes from too great a diſtention of the blood-veſſels, muſt act equally or even more upon the brain; and therefore the ſigns of this diſorder are beſt known from the injured functions of the brain, ſince it does not ſeem poſſible for the diſtenſion of the veſſels to compreſs that part of the encephalon which ſerves to the voluntary motions of the muſcles, without touching the reſt, upon which the other functions of the brain depend. Hence alſo in the caſe beforementioned in the comment to §. 661, where a weakneſs enſued after a contuſion of the head, from a ſerous liquor being collected in the cortical ſubſtance of the brain, there was a weakneſs of the memory and a ſlight delirium attended alſo at the ſame time.

But it muſt be obſerved that the functions of the brain may be alſo diſturbed from too great inanition of the veſſels. For when any one faints away after copious bleeding, a trembling, with ringing in the ears, and a vertigo with darkneſs uſually precede; the ſame is alſo true of any other ſudden evacuation, by an over-purging, *&c.* If therefore there are none of the ſigns of too great an evacuation (§. 662.) we know that theſe diſorders proceed from a compreſſure of the encepha-

lon; whether that ariſes from too great a fulneſs only, or from an imperviouſneſs of the humours, or elſe from an obſtruction of the veſſels: for when impervious humours heſitate in the narrow extremities of the veſſels, or are tranſmitted thro' them but with great difficulty, the very tender veſſels may be ſo far dilated by the impulſe of the vital fluids urging behind, as to compreſs the very ſoft pulp of the encephalon. Hence Hippocrates [k] pronounces, *Prædebilitatorum* (προεξασθυατησάντων) *deſipientiæ peſſimæ*, "Fainting away "from great weakneſs to be moſt dangerous." But ſleep, if profound, denotes an increaſed compreſſure of the brain, and that it now inclines to an apoplexy. But concerning the trembling, as we mentioned before in the comment to § 661. Hippocrates remarks, *Quibus capitis & cervicis dolores, atque totius corporis cum tremore imbecillitas quædam, ſanguinis eruptiones ſolvunt.* "That "thoſe who have a pain of the head and neck, "with a ſort of trembling and weakneſs through- "out the whole body, are relieved by eruptions "of blood." Namely, when by this means the too great quantity of blood diſtending the larger veſſels is removed. But a vertigo, as was ſaid in the comment to § 267, is of all diſorders of the brain almoſt the ſlighteſt, and almoſt every diſorder of the head begins with it; and when they are cured they generally leave a vertigo as the laſt ſymptom. In the ſlighteſt vertigo there ſeems to be a rotation of all objects, which denotes an ineipient compreſſure of the encephalon: but as the diſeaſe increaſes there ſeems to be a darkneſs before the eyes; and afterwards, when all the powers of the body are weakened, the patient falls down; and

[k] Prædict. Lib. I. Charter. Tom. VIII. pag. 705. Coac. Prænot. N°. 102. ibid. pag. 857.

a ſevere vertigo uſually terminates in an epilepſy, or frequently in an apoplexy. Even Hippocrates tells us, that a vertigo ariſes in diſeaſes from a diſtenſion of the veſſels with blood, when he ſays [l], *Tenebricoſas vertigines ab initio ſanguinis e naribus fluxus ſolvit.* "A flux of blood from the "noſe terminates dark vertigoes in the begin-"ning." But a vertigo is generally accompanied with a ringing in the ears, which Hippocrates tells us is a ſign that the brain is affected, and eſpecially compreſſed: for ſometimes there is obſerved ſuch a troubleſome ringing of the ears in diſeaſes without a vertigo, when the arteries, diſperſed through the organs of hearing, begin to compreſs the adjacent nerves; or when a conſiderable trunk of an artery lodged in the dura mater, being dilated with a greater quantity of blood, affects the auditory nerve in that part where it enters the os petroſum: for, ſays he [m], *In febribus ardentibus, ſi aurium ſonitus accedant cum viſus hebetudine, & gravitate ſecundum nares, melancholico modo mente moventur, ſanguine ipſis non erumpente. Tinnitus in acutis, & ſonitus in auribus, lethale.* "If in "ardent fevers a noiſe in the ears attends with a "dulneſs of the ſight, and inſenſibility of the ſmel-"ling, unleſs ſuch have an eruption of blood, "falſe impreſſions are made on the mind, as in "melancholy people. [n] And again, that a ring-"ing and noiſe in the ears is a fatal ſign in acute "diſeaſes." That is to ſay, if the incipient compreſſure of the brain is not immediately relieved by an hæmorrhage raiſed either ſpontaneouſly or by art, *Sonitus aurium cum viſus hebetudine, & ſecundum nares gravitate, mentem emovet, & ſanguinem profundit.* "A noiſe in the ears with a dul-"neſs,

[l] Coac. Prænot. N°. 341. Charter. Tom. VIII. pag. 871.
[m] Ibid. N°. 132. pag. 859. [n] Ibid. 194. pag. 862.

" neſs of the ſight, and an inſenſibility of the " ſmelling, diſorders the mind and excites a flux of " blood[o]." Many more paſſages of the like kind are to be met with in Hippocrates.

SECT. DCLXVI.

BUT that which ariſes from a weakneſs of the heart we know from the ſigns of a deficient circulation, § 106.

In the heart lies the origin of the circulatory motion; for all the circulating humours return by the veins to the heart, and are at length expelled again from thence by the arteries. But it is certain that as the heart is a muſcle, its motion requires an influx of the nervous ſpirits. But the heart, by the interpoſition of the machine of the cerebellum, is the cauſe of renewing the motions in itſelf, when it propels the blood by its muſcular force, through the arteries of the encephalon. Hence we only know that a weakneſs of the heart attends from thoſe ſigns which demonſtrate its action to be leſſened. But the whole power of the heart is employed in exchanging the blood contained in its cavities; and therefore the motion of the humours being diminiſhed through the veſſels, will be a ſign that the heart is weakened. But the muſcular force of the heart, whereby its contained blood is moved through the arteries, may be weakened by cauſes ſeated without the heart itſelf; as when, for example, the cerebellum or nerves thence continued to the heart are compreſſed: but concerning theſe, we treated before. But we here conſider only that weakneſs of the heart which derives its

[o] Coac. Prænot. Nº. 132. Charter. Tom. VIII. pag. 863.

origin from cauſes reſiding in the heart itſelf, although the other conditions neceſſary for the heart's motion, and placed without it, are well diſpoſed. But concerning this weakneſs of the heart we treated before at § 661. Since therefore the force of the heart may be diminiſhed alſo by other cauſes (§ 662 to 666) already enumerated, it is evidently difficult to diſtinguiſh betwixt the weakneſs of the heart, whoſe cauſe reſides in itſelf, ſince the effect is always the ſame, namely, a deficiency of the circulation. But we conclude that a weakneſs of the heart, properly ſo called, attends, if there are none of the cauſes preſent hitherto mentioned; and yet the circulation appears deficient.

SECT. DCLXVII.

LIQUID food, coming near to the nature of the blood, digeſted by art, and ſoft jellies prepared from animals and vegetables, and mixed according to art with vinous liquors and ſpices, given often and in ſmall quantities at a time, with gentle frictions externally, will procure the moſt convenient repletion or reſtitution of what is waſted; more eſpecially if they are formed with materials ſuitable againſt the nature of the diſeaſe.

We come now to treat of the cure of weakneſs, which ought to be different according to the variety of the cauſes; and therefore every claſs of the cauſes will require a particular method of cure. Firſt then, we ſhall here treat of the cure of weakneſs ariſing from the emptineſs of the veſſels exhauſted of their fluids.

Hip-

Hippocrates [p] lays it down as a general axiom in practice, that diſeaſes ariſing from fulneſs may be cured by evacuation; and on the contrary, thoſe ariſing from evacuation may be removed by repletion: therefore the curative indication in this caſe demands a reſtitution of the exhauſted juices to fill the too empty veſſels. But here the greateſt difficulty lies in the reſtitution of the ſame matter, which has been waſted from the body: for we may eaſily fill weak bodies with food and drink, but for the loſt ſubſtance to be reſtored from them, they ought to be changed by the powers of the body, ſo as to put on the nature of healthy humours. But this change in the aliments is performed by the conjunct actions of the veſſels and viſcera conſpiring together; as alſo from a mixture with a due quantity of healthy humours already pre-exiſting in the body, with a great quantity of which only a litle of the crude chyle is gradually mixed (ſee § 25. N°. 1.) But in this kind of weakneſs there is a deficiency in the quantity of healthy humours, and there is a leſs efficacy exerted by the veſſels and viſcera upon the humours, and therefore that power languiſhes whereby the human body aſſimilates the ingeſted food into its own nature. It is therefore neceſſary for ſuch aliments to be taken in as may be ſubdued and changed by the weaker powers of the body; for they err much who endeavour to fill a weak and exhauſted body by the ſtronger foods. For, as Celſus [q] affirms, *Quo valentior quæque materia eſt, eo minus facile concoquitur, ſed ſi concocta eſt, plus alit. Itaque utendum eſt materiæ genere pro viribus; moduſque omnibus pro genere ſumendus. Ergo imbecillis hominibus, rebus*

[p] Aphor. 22. Sect. II. Charter. Tom. IX. pag. 63.
[q] Celſ. Medic. Lib. II. cap. 18. pag. 100.

infirmiſſimis opus eſt: mediocriter firmos, media materia optime ſuſtinet: & robuſtis apta validiſſima eſt. "The ſtronger the matter of which any food "conſiſts, the more difficultly is it concocted; "but if the concoction is once effected it nouriſhes "more. Therefore ſuch food is to be choſe, "with reſpect to its matter, as is agreeable to the "powers, and to the manner in which it is to be "taken by all. Therefore the weakeſt aliments "are neceſſary for weak people: but for ſuch as "are moderately ſtrong, food of a middling mat-"ter ſupports the beſt, while the ſtrongeſt foods "are beſt adapted to the robuſt." The food ſhould be therefore liquid, becauſe the whole action of the chylificative viſcera conſiſts in changing it into a fluid chyle, and therefore their action will be aſſiſted by taking in liquid foods: they ought again to be ſuch as are like the blood, that is, which contain a great deal of the ſame matter, which comes near to the nature of the loſt ſubſtance; and which may be ſubdued by the actions of the veſſels and viſcera yet remaining, however languid (ſee § 28. N°. 1.) More eſpecially here are recommended fleſh broths of beef, veal, mutton, or poultry, but not made very ſtrong and thick; being very careful to take off all the fat which might ſit uneaſy upon a weak ſtomach, and turn very rancid; making an addition of a little ſalt or juice of citrons, partly for the agreeableneſs of the taſte, and partly to prevent putrefaction, to which they ſpontaneouſly incline. But how much good may be expected from fleſh-broths, is evident from that wonderful obſervation of Lower in the comment to § 234. N°. 4. From whence it appears that in a patient exhauſted by a profuſe hæmorrhage, fleſh-broths drank plentifully flowed through the veſſels inſtead of blood, by which means the youth re-

ecovered, though he had loſt almoſt the whole naſs of blood. The like liquid nouriſhment may be alſo prepared from milk, decoctions of bread, he white of eggs, &c. Nor will it be injurious o add a moderate quantity of wine and mild ſpices o theſe, to raiſe the weak powers, and render the efficacy of the veſſels and viſcera more active upon he ingeſted food by theſe agreeable ſtimuli. But n profuſe hæmorrhages, as long as there is juſt eaſon to fear a return, it is better to abſtain from ll ſtimulants, and ſupply the patient with fleſh-broths only; as, for example, in women who miſ-carry, where the blood often flows from the ute-us in a continued ſtream, till the patient is re-duced to the greateſt weakneſs, and are barely not deprived of life: but if wine or ſpices are given o theſe, the little quantity of blood which yet re-mains in the body would be expelled through the open veſſels; but if they are only ſupported by leſh-broths they almoſt conſtantly recover again. But in the other evacuations which proceed from the ong continuance of the diſeaſe, as ſweats, a di-arrhœa, &c. the uſe of wine and aromatics is ſafer, but given in ſuch a quantity as not to be injuri-ous by their ſtimulus; becauſe we here treat of weakneſs as a febrile ſymptom. But all theſe ali-ments, however good in themſelves, may offend n too great a quantity, if too much of them is taken into a weak body: for after ſuch profuſe eva-cuations there are but few of the animal humours left in the body, which would therefore be too ſuddenly filled with crude juices, following their own inclination or ſpontaneous change rather than be altered into our own nature. Moreover, as the powers which ought to move the humours through the veſſels are here ſo infirm, the body will be ra-ther oppreſſed by the great quantity of liquors ta-

ken in, which being collected into the larger or ſmaller cavities of the body might occaſion a dropſy. Hence it is evident that theſe ought rather to be given frequently and in ſmall quantities, till the patient recovering ſtrength is able to bear more. Galen [r] juſtly adviſes in recovering weak patients, to obſerve that the ingeſted nouriſhment be in proportion to the nouriſhing powers; *Si enim nutrimentum ſe ipſum concoqueret, & diſtribueret, & alendis partibus aſſimilaret, & partibus quibus alimento plurimo opus eſt; adhæreſceret, procul dubio maximè nutriente cibo opus eſſet: verum quum non aliud eſt, quod nutrimentum deſiderat, aliud quod ipſum conficit, ſed, quod nutriendum eſt, ipſum ſibi & nutrimentum attrahit, & mutat & concoquit, & adjungit & aſſimilat, &c.* "For if the patient can concoct and diſtri-
" bute the nouriſhment in himſelf, and aſſimilate
" the ſame to the parts to be nouriſhed, ſo as to ad-
" here to thoſe ſolids where the moſt nouriſhment
" is wanted, the moſt nouriſhing food is then
" beſt: but when there are no parts which require
" further nouriſhment, then thoſe organs which pre-
" pare the nouriſhment, concoct, change and attract
" it to themſelves, whence it becomes aſſimilated
" and conjoined, *&c.*" Hence it appears the ſtrength and quantity of the food ought to be in proportion to the ſtrength of the body.

But as the action of the veſſels, by which they operate upon their contained fluids, and move them forwards, is deficient in weak people after too profuſe evacuations of body, their efficacy is therefore happily ſupplied by external frictions (as we ſaid before upon another occaſion in the comment to § 28. N°. 2.) But after profuſe hæmorrhages frictions are not to be uſed, unleſs we are cer-

[r] Method. Med. Lib. VII. cap. 6. Charter. Tom. X. pag. 163.

certain that the bleeding veſſels are ſo far cloſed, contracted, and ſecured, that there is no danger of their opening again ſo as to renew the hæmorrhage when the motion of the blood is increaſed by friction. But the frictions ought always to be gentle to avoid too much increaſing the motion of the blood, whereby the nouriſhment taken in might be diſſipated; but only ſuch a friction is required as will make an equable diſtribution of the nouriſhment through all the parts of the body. Hence Celſus [s], in ſpeaking of friction, ſays very juſtly, *At, ubi totius corporis imbecillitas hanc curationem per totum id exigit, brevior debet eſſe & lenior, ut tantummodo ſummam cutem emolliat, quo facilius capax ex recenti cibo novæ materiæ fiat.* "But when the "weakneſs of the whole body requires this reme- "dy to be applied throughout, it ought to be mo- "derate, and of ſhort duration, ſo as only to "ſoften or raiſe a gentle moiſture of the ſkin, by "which means new matter may be more eaſily "made from the food lately taken in." For much friction waſtes the body, and moderate friction fills it, as Celſus [t] obſerves from Hippocrates. How much this intention will be anſwered, if a weak perſon lies in bed with a ſtrong and juvenile body, has been ſaid before on another occaſion in the comment to § 28. N°. 1. as alſo at § 611.

By all theſe means may be commodiouſly made a repletion of the body exhauſted by too great evacuation. Only one thing remains yet to be remarked, that the nouriſhment taken in ought to be of a contrary nature to that of the diſeaſe. Thus for example, if a perſon ill of an ardent fever is taken with a profuſe hæmorrhage of the noſe, ſo as to loſe almoſt all his ſtrength; in that caſe decoctions of bread, with the juice of citrons, oranges,

[s] Medic. Lib. II. cap. 14. pag. 90. [t] Ibid. pag. 88.

oranges, Rheniſh wine, &c. will ſupply proper matter for filling the body, ſince that diſeaſe naturally inclines to turn the humours putrid. On the contrary, if a woman naturally weak has loſt a quantity of blood by miſcarriage, fleſh-broths are preferable to other nouriſhment.

SECT. DCLXVIII.

IF the weakneſs proceeds from an imperviouſneſs of the fluids (§ 663), thoſe remedies are to be uſed mentioned at § 75, and 132 to 137; for there is nothing can conduce more than theſe to the cure of this diſorder.

We find principally two kinds of viſcidity in our fluids, by which they are rendered impervious (as we obſerved before at § 663); one of which is cold and mucous, but the other hot and inflammatory. The cure requires us to reſtore the due perviouſneſs of the fluids by attenuating this viſcidity. In what manner and by what remedies the cold viſcidity may be reſolved, we demonſtrated in the comment to § 75. But what is required to remove the inflammatory viſcidity may be underſtood from what was mentioned concerning the cure of obſtruction (§ 132, & ſeq.). Hitherto alſo ought to be referred thoſe remedies, which we recommended to procure a fluidity to the inflammatory matter obſtructing the veſſels, for the removal of an inflammation (§ 398). At the ſame time it muſt be well obſerved here, that the force of the fever itſelf happily diſſolves the imperviouſneſs of our humours, if the violence of it is ſo moderated as to preſerve the very tender veſſels from being deſtroyed by the too great force of the fever, and to

pre-

revent the too great diſſipation of the more thin umours, (concerning which you may conſult what as been ſaid in the comment to § 609, & ſeq. to 16). But from all this it is evident, that the reateſt caution is neceſſary to procure a happy re-olution of an impervious fluid, ſince the imper-ious matter is often various, and of a different ature, ſo as frequently to require even oppoſite re-nedies.

SECT. DCLXIX.

ALSO the cure of the weakneſs proceeding from an obſtruction of the veſſels (§ 664,) is to be had from § 124, to 144.

After the cauſe of the obſtruction appears from a careful examination, the cure may be had from what has been ſaid in the aphoriſms before cited concerning the cure of obſtruction.

SECT.

SECT. DCLXX.

BUT the weakneſs which ariſes from a compreſſure of the encephalon (§ 665.) is for the moſt part removed by ſuch things, as being applied to that part may remove the obſtructing matter (§ 124, to 144,), and divert or call off the impetus of the blood towards other parts. This is performed by moiſtening the noſtrils, head, face, mouth, and neck, with emollient fomentations, and by applying bliſters to the feet.

When the ſubſtance of the brain and cerebellum are compreſſed from an obſtruction of the veſſels with impervious humours impacted into them by the impulſe of the vital fluids urging behind, ſo as to diſtend the veſſels, and compreſs the adjacent parts, it is then ſufficiently evident, that every thing will be required the ſame as we recommended to remove an imperviouſneſs of the fluids, and to open the obſtructed veſſels. But as there is here ſo much danger from a diſturbance of thoſe functions whereon our life and humanity depend, therefore all the aſſiſtances of art are deſervedly to be uſed. But much good may be hoped for by turning off the violence of the diſeaſe from the head towards ſome other part; for by that means the impervious liquids impacted into the ſmall veſſels, are prevented as much as lies in the power of art from being further urged into their more narrow extremities; for thereby all the diſorders might be increaſed, and the cure of the obſtruction there formed might be rendered more difficult.

But in what manner the impetus of the humours may be drawn off from any part of the body towards ſome other, has been explained at § 396. N°. 4. where we treated on the cure of an inflammation; where we alſo ſpoke concerning the efficacy of bliſters and other remedies in making a revulſion. But bliſters are more eſpecially applied to the feet in this caſe, becauſe thus the impetus of the humours is derived towards a part of the body moſt diſtant from the head. But ſince, as was ſaid before in the place laſt cited, the veſſels reſiſt the blood to be propelled through them by the heart, partly by their fulneſs, and partly by the ſtrength or reſiſtance of their coats which oppoſe their dilatation, it is evident that the impetus of the blood may be turned off from any part, by removing the fulneſs of the veſſels, or diminiſhing the reſiſtance of their ſides in other parts. But above all, the revulſion will be made the moſt effectually, if that part of the body, towards which the revulſion is attempted, receives its arterial blood from the ſame larger trunks with thoſe parts from whence the curative indication directs the impetus of the blood to be drawn off. Hence it is ſo uſeful in this caſe to moiſten the noſtrils, head, face, and mouth, with emollient relaxing fomentations, that by leſſening the reſiſtance to the ſides of the veſſels in theſe parts, which receive their blood from the external carotides, the quantity and impetus of the blood to be drove towards the encephalon by the internal carotides may be leſſened. For this reaſon Hippocrates [u] would have the head to be waſhed with much warm liquor in a phrenzy, and in the ſame diſeaſe Sydenham [w] orders the hair to be ſhaved off, and the head to be covered with a cap, that

[u] De affection. cap. 3. Charter. Tom. VII. pag. 622.
[w] In ſchedula monitoria de novæ febris ingreſſu, pag. 660.

that the head being naked may not lie expoſed to the external cold; for by this means a very free perſpiration is made through the whole ſkin of the head, and a revulſion procured from the internal parts of the head. For we ſee in other diſeaſes, that as ſoon as the free circulation of the humours is impeded through the parts which receive their blood from the external carotides, the internal parts of the head are then too much oppreſſed or urged by the blood. This is evident in a coryza or cold, where the membrane diſperſed throughout the whole internal ſurface of the noſe is ſlightly inflamed, and often ſo much ſwelled that no air can be inſpired through the noſtrils: For in the firſt ſtage of this diſeaſe there is a heavineſs in the head, all the ſenſes are dull, the ſleep is diſturbed, and the muſcles ſeem indiſpoſed to their uſual actions; all which diſorders are beſt relieved if the noſtrils are fomented with the vapours of hot water, to reſtore theſe membranes to their due moiſture, and recover the free circulation of the humours in the veſſels diſperſed through them. For this being done the head will be relieved, and for the moſt part theſe ſymptoms will vaniſh, or be greatly diminiſhed.

It is to be obſerved, that in inflammatory diſeaſes of the head, certain injuries of the functions of the brain continue a long time, even though the violence of the diſeaſe has been gone off for ſome time, and all the fever ſeems to be abſent; whence often a weakneſs, ſtupidity, ſleepineſs, *&c.* remain. For when the arteries in the cortical ſubſtance of the brain and cerebellum, have admitted the groſſer humours, as thoſe veſſels are deſtitute of ſtrong coats, they cannot eaſily contract themſelves again, even though the impetus of the humours urging behind the obſtructing particles ſhall be diminiſhed;

and

and this ſeems to be a very probable reaſon why the ſymptoms ariſing from a compreſſure of the nerves in their origin at the brain and cerebellum, from a dilatation of their adjacent veſſels, continue ſo long 'till the impacted particles of the humours being gradually diſſolved in the narrower parts of the dilated veſſels, the integrity of the functions returns. Sydenham [x] was ſurprized that he could not remove theſe ſymptoms, though he tried all means by bleeding, bliſtering, cupping, clyſters, *&c.* for which reaſon afterwards, when the patient had been bled, he only gave two or three clyſters of milk and ſugar in the firſt days of the diſeaſe, to abate the force of the fever, which being then epidemical, uſually affected the head more immediately; and he attempted nothing farther, only ordered the patient to abſtain from fleſh and ſpirituous liquors. But, when he carefully attended to every thing, in order to learn the method of nature in ſubduing thoſe ſymptoms, he found to his joy that the diſeaſe, upon which he was meditating, went of ſafely, though ſlowly, of itſelf. Hence afterwards, when the violence of the diſeaſe began to remit, he let it take its own courſe, ſo as to wear out or deſtroy itſelf by degrees [y]. If therefore a weakneſs ſhould remain in ſuch a diſeaſe from a compreſſion of the nerves about their origin in the brain and cerebellum, it ſeems to be the part of a prudent phyſician not to exhauſt the body any farther by evacuations, but to commit the whole buſineſs to time and nature. I well remember myſelf to have often met with the deſired ſucceſs by this method.

[x] Sect. V. cap. 2. pag. 287. [y] Ibid. 282.

SECT.

SECT. DCLXXI.

BUT that which ariſes from a weakneſs in the heart is ſeldom remedied unleſs ſlowly; but the general remedies beforementioned (§ 667 to 671) may be here ſerviceable.

If the weakneſs of the heart ariſes from a cauſe not reſiding in itſelf, as when for example the heart as well as the whole body languiſh from a deficiency of the vital humours after profuſe evacuations; or if the cauſe, being lodged near the cerebellum, compreſſes the cardiac nerves in their origin, then ſuch things as are uſeful to relieve thoſe cauſes will be here equally ſerviceable, concerning which we ſpoke before (§ 667 to 671.) But when the cauſe of the weakneſs reſides in the heart itſelf, how ſhall we be able to diſtinguiſh it? It will certainly be very difficult. But although we ſhould diſcover it thus, what curative indication can be found in a caſe where the heart, which labours for all the reſt of the body, is itſelf only deficient? When therefore from any cauſe the muſcular fibres of the heart have once loſt their due ſtrength, they will not ſufficiently reſiſt the diſtending blood, whence they will be ſtretched, and conſequently the weakneſs once formed will be continually increaſing. It is therefore very rarely that a weak heart can be cured, ſince it never ceaſes to labour; and all the little hope which remains is, that, by a very gentle motion of the circulation, ſuch only as may be ſufficient to continue life, an opportunity may be given to the weak fibres to recover their ſtrength gradually by being diſtended with a leſs force.

force. For all the cordial medicines, as they are termed, which name they merit, either for increasing the languid motion of the blood; or from the repleniſhing the exhauſted veſſels; theſe always pre-ſuppoſe an entire or healthy ſtate of the heart; and by theſe we can irritate the heart, and excite it into more frequent contractions; but to ſtrengthen it when the diſorder lies in its proper fabric is always extremely difficult, if not wholly impracticable.

SECT. DCLXXII.

FROM what has been ſaid (§ 660 to 672) it appears to us how few underſtand what cordials are in acute fevers, and what ſort of weakneſs that is, which is often inſuperable in fevers.

There is not any remedy, how much ſoever it may be famed, that can be abſolutely and of itſelf termed a cordial in fevers, or a recruiter of the ſtrength, ſince the uſe or abuſe of it depends entirely upon the knowledge of the various cauſes of the weakneſs. In the beginning of acute diſeaſes a weakneſs ſometimes ſuddenly ariſes from an over quantity or a rarefaction of the blood diſtending the veſſels, or from an imperviouſneſs of it through the veſſels: but in that caſe ſuch things as leſſen the quantity or too great impetus of the blood, are truly cordials, and abate the force urging againſt the impervious fluid in the obſtructed veſſels. Hence opening a vein ſo frequently recovers the ſtrength in the beginning, when it would be very injurious in the end of the diſeaſe; and on the other hand ſuch things as by a grateful ſtimu-

lus increaſe the languiſhing motion of the humours and the ſeparation of the morbific matter thereo depending, would nevertheleſs certainly increaſ the weakneſs which attends in the beginning o theſe diſeaſes. Thoſe things which, by filling th body exhauſted with profuſe evacuations, migh be uſeful, would be injurious, if no ſuch loſs of th fluids had preceded. Even after ſuch acute diſea ſes as naturally are uſed to ſettle their violenc chiefly upon the head; the remaining weakneſs though the force of the diſeaſe is already over, wil not in the leaſt give way to ſtimulating cordials but can only be ſafely cured by time, as we ob ſerved a little before at § 670. Whence it is evi dent how much attention is neceſſary to rightly de termine in the cure of acute diſeaſes, whether cor dials are uſeful, and what kinds of them are neceſ ſary: and therefore it is evident that in acute diſ eaſes cordials are ſeldom ſufficiently underſtood Of this opinion was Hippocates [z], who in treating of theſe ſays; *Neque enim horum adeo peritos vi deo Medicos, qui, ut oportet, dignoſcant in morbi debilitates, & quæ ob vaſorum inanitionem, & qua ob aliud quoddam irritamentum, & quæ ob dolorem & ab acumine morbi oriuntur, quoſque affectus, a diverſas eorum ſpecies natura noſtra, & habitus ſin gulis pariat: Quamvis hæc cognita aut ignorata ſa lutem aut mortem adferant*, &c. " Nor do I know " any phyſicians ſo ſkilful in the knowledge of " theſe, as they ought to be, to diſtinguiſh in the " weakneſſes of diſeaſes, which ariſe from an emp- " tineſs of the veſſels, and which from any other " irritation, or thoſe which ariſe from pain and the " violence of the diſeaſe, and what diſorders with " their ſeveral kinds are peculiar to the individual " nature and conſtitution of each of us: and this, " not-

[z] De diæta acutor. Charter. Tom. XI. pag. 69, 70.

notwithſtanding the knowledge or ignorance of theſe particulars may be the cauſe of the health or deſtruction of the patient, &c." The greateſt plexity often ariſes to the phyſician, more eſ- cially to thoſe who attend at the courts of the eat, when even againſt their knowledge or ad- e ſtimulating cordials are obtruded upon the pa- nt under ſome formidable title of alexipharmics, l which being taken do great miſchief; but if event of theſe doubtful diſeaſes turns out for worſe, and theſe cordials are not uſed, the phy- ans are blamed, as if they had neglected a me- ine of importance. For when in the beginning the moſt acute diſeaſes the patient's ſtrength is preſſed, the unſkilful accuſe the malignity of diſeaſe, and adviſe cordials to raiſe the powers, en not without great damage to the patient. nce Sydenham [a] not without reaſon pronounces; *od de Malignitate (ſive notionem, ſive verbum eris) opinionis inventio humano generi longe ipſâ veris pyrii inventione lethalior fuit. Cum eæ fe- præſertim maligne dicantur, in quibus intenſi- præ cæteris inflammationis gradus conſpicitur.* That the opinion of malignity, either with re- gard to the notion or the word, has been an nvention much more deſtructive to mankind than the invention of gunpowder. Becauſe thoſe fevers are more eſpecially ſaid to be malig- nant, in which there is ſo obſervable a greater de- gree of inflammation than in others." And for s reaſon he condemns the perverſe uſe of cordials frequently throughout all his works.

What that weakneſs in fevers is which frequently ves inſuperable.] Namely, if the cauſe of the akneſs cannot be removed. But this frequently pens when the body is exhauſted by evacuations

[a] In Shedul. monit. de novæ. febris ingreſſu, pag. 681.

which cannot be reſtrained; as for example, colli quative ſweats in a confirmed phthiſis, or the diar rhœa which uſually cloſes the tragedy of that di eaſe; in that caſe even the moſt famed cordials ar in vain adminiſtered; or if the thick blood by an in flammatory tenacity is violently urged by the forc of the fever into the very tender ſmall veſſels o the encephalon, ſo that it cannot be reſolved, no thing will relieve that weakneſs. If an artery, bur by the violence of the fever, pours out his bloo into the ventricles of the brain, where by its bul it compreſſes the adjacent parts, in that caſe th uſe of all medicine is in vain. But that this ma happen in fevers is evident, ſince the arteries in th membranes of the noſe, which are much ſtronge than in the brain, are frequently burſt, and ſome times the like happens even in the lungs or kidneys whence in acute diſeaſes frequently enſues a fat hæmoptoe or bloody urine. But alſo from a diſten ſion of blood-veſſels in the encephalon, the nervou filaments being compreſſed a long time together i their origin, afterwards remain impervious durin life; for their contiguous ſides growing togethe and no more fluid paſſing through them, they dr up or wither. The incurable deafneſs, blindnes loſs of memory, fooliſhneſs, *&c.* which continu during life after acute diſeaſes of the head (as ap pears from medical obſervations and hiſtories) ſu ficiently prove that theſe effects ought to be feared

Of Heat in FEVERS.

SECT. DCLXXIII.

THE external heat in fevers is known by the thermometer, and by the ſenſe of e patient, as the internal heat is known from e ſenſe of the patient and redneſs of the ne.

Heat is found to be ſo conſtant a ſymptom in vers, that Galen places the individual nature or ence of a fever in heat, as likewiſe have other ry celebrated phyſicians after him, as we obved in the hiſtory of fevers. In a healthy per- n there is a certain determinate degree of heat; t the febrile heat properly ſpeaking much exeds the natural one; and it is concerning this ceſs of the heat beyond what is healthy that we e to examine here under the title of heat in fers. But in this aphoriſm we conſider how the brile heat preſent may be known. But heat is rceived both in the external ſurface of the body, d likewiſe in the inmoſt receſſes thereof as long we live, as every one knows; but this is (*cæteris ribus*) always greater in the interior parts; beuſe the external heat is taken off by the ambient r, which is always much colder than the human dy. The external heat of febrile patients may deed be perceived by the touch, but one cannot ereby exactly diſtinguiſh its various intenſity or grees, becauſe the ſenſe of heat may be different us upon many accounts: thus, for example, hen our hands are cold, the hand of a patient will em to be hot, which yet would hardly ſeem warm our hands were much heated either by rubbing

or any other cauſe. Therefore the moſt certain method of meaſuring the febrile heat is by the thermometer, of which there are many good ones made at preſent portable, and called after their inventor *Fahrenheit*; and the moſt exquiſite are thoſe which contain mercury inſtead of any other fluid. With ſuch a thermometer let the heat of a healthy perſon be firſt meaſured, and the degree marked upon the ſcale affixed; and then this being known, if the ſame thermometer is held in the hand of a febrile patient, or the bulb of it put into his mouth, or applied to the naked breaſt, or under the arm-pit, for a few minutes, the different height of the aſcending mercury will make it appear how much the febrile exceeds the natural and healthy heat. But it appears that thus we are only acquainted with the external heat in the ſurface of the body or internal parts of the mouth, which have a free communication with the external air, and are therefore always leſs hot than the internal parts of the body. Add to this that ſometimes the external parts of the body are not much hot in fevers, while the internal parts are burnt up; as Hippocrates [b] obſerves in an ardent fever, and juſtly derives from thence a very bad preſage. That ſuch a heat attends we know from the ſenſe of the patient, who uſually complains of an intolerable burning, more eſpecially about the vital viſcera in theſe moſt fatal fevers.

The other ſign by which the internal heat is known in febrile patients, is the redneſs of the urine. It is demonſtrated in our chemiſtry and theoretical lectures [c] or inſtitutes, that the colour of urine proceeds entirely from its oil, the ſalt being

[b] De Morbis Lib. I. cap. 13. Charter. Tom. VII. pag. 548.
[c] Vide Inſtitut. Medic. H. Boerhaave, § 378. & Chem. Tom. II. pag. 310.

being attenuated and ground together; and therefore the colour of the urine is more intenſe, as there is a greater proportion of oil with reſpect to the other conſtituent parts; and therefore this liquor may incline through various degrees, from the ſtraw-colour of healthy urine to a deep redneſs. But this mixture of the oil with the urine ſuppoſes a violent attrition betwixt the conſtituent parts of the humours, and betwixt the humours and their veſſels [d]: and ſince from the ſame cauſe proceeds the increaſed heat in fevers (as we ſhall preſently make appear § 675.) the reaſon is therefore evident why a redneſs of the urine is deſervedly accounted a ſign of internal heat. The truth of this is confirmed by daily obſervation, namely that the redneſs of the urine increaſes in proportion to the heat of the body. For the urine of people who are weak and of a cold habit is pale, but that of robuſt people of a warm habit is much higher coloured. Even in the ſame perſon the natural colour of the urine is often increaſed to a very intenſe redneſs, only by violent and long continued exerciſe of body; but then alſo the heat of the body is proportionably increaſed at the ſame time. But it is to be obſerved that the colour of the urine may be likewiſe increaſed from other cauſes, as, for example, profuſe ſweats, or abſtinence from drink a long time, whereby the diluent vehicle of the urine is leſſened, and conſequently the proportion of the oil is increaſed with reſpect to the other principles. For, after long abſtinence from food or drink, there is very little urine diſcharged but ſuch as is very red, or high coloured, and extremely acrid [e]. It ought therefore to be conſidered, whether or no the redneſs of the urine ſhould not

[d] Inſtitut. Medic. ibid. § 999.
[e] Ibid. § 372.

be aſcribed either wholly or in part to theſe cauſes. It muſt alſo be obſerved that ſometimes the urine appears thin and without colour in fevers, though at the ſame time there is a very intenſe heat; and this may happen if the patient being very thirſty drinks great quantities of thin liquors, ſoon paſſing off by urine, which, being thus diluted with ſo much water, will be of a paler colour: but even ſometimes in acute diſeaſes ſuch a thin and colourleſs urine is obſerved without any ſuch plentiful drinking of thin liquors preceding; but then this is always a very bad ſign; whence Hippocrates ever condemns ſuch an urine in theſe diſeaſes; and in a phrenzy he makes it a fatal ſign, as we ſhall declare hereafter. For ſuch a colourleſs urine denotes that the ſalts and oils of the blood, being rendered more acrid by the febrile motion, are not waſhed out by the urinary paſſages, but retained in the body, where they may do great miſchief: or elſe it denotes that the blood, being thickened by an inflammatory tenacity, cannot be attenuated by diluent liquors, but that the drink taken in is ſoon after diſcharged again from the blood; and therefore the greateſt danger is threatened from an impervioufneſs of the humours, and a retention of their acrid parts.

SECT.

SECT. DCLXXIV.

BUT this febrile heat always ſuppoſes or requires a greater quantity of fire in the part which it heats more than the reſt.

All people by a common aſſent juſtly aſcribe heat to fire, becauſe theſe are inſeparably connected together; for wherever we obſerve the quantity of fire increaſed as to ſenſe, we likewiſe perceive an increaſe of the heat; whether that proceeds from a change in our ſenſitive organs from the fire applied to them, or whether we know this to be ſo from ſuch effects as appear by evident experiments to be produced from the increaſed quantity of fire in any part. But the ſenſe of heat perceived in us can determine nothing certain with reſpect to the quantity of fire contained in any part, ſince it only repreſents the mere change of the perceiving organ to the mind, which change in the organ may be real and different, though the very ſame quantity of fire be contained in a part. For, frequently, when thunder, lightning, and rain or hail happen in the ſummer-time, after an almoſt ſuffocating heat in the air, we perceive a very troubleſome ſenſe of cold, even tho' there is then ſo great a heat in the air, that if a perſon who had been a long time expoſed to a ſevere winter's froſt was to enter a chamber, the air of which was to be thus hot, he could not endure it, but would immediately loſe all his ſtrength. Hence it is evident that the ſenſe of heat perceived in us does not always correſpond to the quantity of fire

fire collected in any part. When the celebrated author of these aphorisms treated of fire in his public chemical lectures, he considered it as a thing concerning which we as yet knew nothing, that he might be the better able to detect its nature by experiments only. Yet he found it necessary to be provided with certain marks or signs capable of denoting that the fire to be examined was present, and capable of being accurately distinguished by the senses in any place. But by the most careful examination he then discovered the rarefaction of the bodies only, by which their bulk is found increased without any difference in their weight, afforded that mark or sign whereby it might be known whether the quantity of fire was increased in any place or body. But although neither this nor any other sign can determine how much fire is contained in any place, yet this mark is sufficient to point out the increase and decrease of the fire. The truth of this our author has demonstrated by many fair experiments both in solid and fluid bodies [f].

From what has been said therefore we may take it for granted, that a greater quantity of fire is contained in a place which is hotter than another; and the thermometer, by the expansion of its contained fluid, pointing out the various degrees of rarefaction from fire, one may be therefore able by it to determine the quantity of increase and decrease of the fire in those parts of our bodies to which it can be applied. For when a phlegmon, which derives its name from fire, (as we demonstrated at § 670.) invades the hand, there is a troublesome burning perceived in that part; but also the thermometer, being applied to this part, mani-

[f] Vide H. Boerh. Chem. Tom. I. pag. 130. & seq.

manifeſtly ſhews that a greater quantity of fire is there contained, than in the other parts of the body. Thus in the worſt kind of ardent fevers in which the patient perceives a coldneſs in the extremities, but a burning heat about the præcordia, here the thermometer being applied firſt to the extremities, and then to the naked breaſt, will exhibit to the eye the difference in the quantity of the fire contained in thoſe parts. From hence we may alſo conclude, that in thoſe parts of the body to which the thermometer cannot be immediately applied, a greater quantity of fire is preſent when they are hotter. It now remains for us to ſee what the cauſe is by which a greater quantity of fire may be collected in the body of a febrile patient, either throughout the whole, or ſome particular part.

SECT. DCLXXV.

WHICH greater quantity of fire (§ 674) ariſes from a more violent attrition of the fluid parts againſt each other, and againſt the ſides of their containing veſſels.

All bodies acquire that degree of heat which is common to the medium in which they exiſt, unleſs there is a cauſe exciting heat, that is to ſay collecting a greater quantity of fire in them: and hence after death, the human body by degrees acquires the temperature of the air. There was therefore in life a cauſe generating heat in the body, which cauſe after death is abſent. But as long as we live the humours are moved through the veſſels, which motion altogether ceaſes with death; and only the abſence of this motion deſtroys that exceſs of heat, whereby the human body exceeds the heat of the

ambient medium, even though nothing at all is loſt of the ſolid or fluid parts of the body. For if even the moſt healthy perſon is drowned or immerged under the water, the dead body ſoon grows cold. Since heat therefore attends the motion of the humours through the veſſels, and is deſtroyed when that motion ceaſes, it ſeems that one may thence conclude the motion of the humours through the veſſels in a living perſon to be that cauſe which produces the heat: And in this we are more confirmed, becauſe the motion of the humours being increaſed through the veſſels, the heat is alſo increaſed, as on the contrary it is diminiſhed, when that motion is leſſened. For if the velocity of this motion is increaſed by violent running, the heat may be ſo much augmented as to deſtroy the body in a little time by a moſt ardent fever; but as ſoon as ſuch a perſon is at reſt, the increaſed motion abating, the degree of heat acquired grows gradually leſs, till the perſon returns to his natural and healthy degree of heat, unleſs the humours are ſo altered by the increaſed quickneſs of the circulation, and the heat thence ariſing, as will produce a fever, either by a ſtimulus or coagulum (ſee § 587;) for then indeed the increaſed quickneſs of the blood's motion will continue, together with its effect, a greater heat.

But the origin of heat ſeemed to be ſo abſtruſe in the opinion of the ancient phyſicians, that they believed ſomething divine or miraculous lay concealed therein: whence Hippocrates[g] ſays; *Quod calidum vocamus, id mihi & immortale eſſe videtur, & cuncta intelligere & videre & audire, & ſcire omnia, & præſentia & futura.* "That we call "heat ſeems to me to be immortal, capable of underſtanding,

[g] In Libro de Carnibus, cap. 1. Charter. Tom. V. pag. 302.

" derſtanding, ſeeing, and knowing all things at " the ſame time, both preſent and to come." Hence the antients likewiſe ſay, that the innate heat of the human body ſeems to be a part of the divine ſpirit: (As we ſaid before upon another occaſion, § 440, N°. 3.) the moſt wiſe king Numa would have heat, or fire, worſhipped as the head or principle of all things. But although Galen in one place expreſly denies in words that heat ariſes from attrition in animals; (for thus he expreſſes himſelf[h]. *Non enim ex attritu ſpiritus in arteriis calor generatur in animantium corporibus, ſicuti foras in lapidibus & lignis, ſed contra ab innato calore motus ipſorum fiunt.* " Heat is not generated in " animal bodies from an attrition of the ſpirits " in the arteries, as is common in ſtones and " wood; but on the contrary, their motion pro- " ceeds from the innate heat.") Yet elſewhere he confeſſes[i] that phyſicians diſpute this matter among themſelves, and adds; *Quod autem calor in nobis ſit, evidenter omnibus patet; utrum vero is ex motu in corde & arteriis ortum habeat, vel ſicut ipſum moveri cordi connatum eſt eodem modo & calor, diſſentiunt inter ſe medici.* " What heat is in us " appears evidently to all; but whether or no " it ariſes from the motion in the heart and " arteries, or whether it is inherent or conna- " tural as motion is to the heart itſelf, is, like " that, controverted among phyſicians." Nor is it ſurprizing that Galen ſhould think it difficult for the heat to ariſe from an attrition of the fluids contained in the arteries; ſince he believed that only ſpirits, or the moſt fluid parts of the blood, flowed through the arteries. But in the mean time it is evident from what has been ſaid, that the

[h] Lib. VIII. de Hippocratis & Platonis placitis, cap. 7. Charter. Tom. V. pag. 242.. [i] In libello adverſus Lycum. cap. 2. Charter. Tom. IX. pag. 359.

the opinion of heat ariſing from the motion of the fluids through the veſſels, is very antient.

That fire is collected, and conſequently heat produced even in a great degree from the attrition of ſolid bodies againſt each other, is directly proved by experiments [k]. But it likewiſe appears at the ſame time that if oil, water, or any other liquor is interpoſed betwixt the ſurfaces of the bodies to be rubbed together, there will hardly any heat ariſe even from a violent attrition; or if a heat is produced, it is nothing comparable to that which ariſes from a violent attrition without any liquor interpoſed. From hence ſome phyſicians, even of great fame, have doubted whether heat ought to be aſcribed to this cauſe in the blood, which they are rather inclined to think grows hot from ſomething elſe, and this even though they cannot deny that this heat is increaſed by motion. The celebrated Schelhammer [l] thinks that thoſe who deny the innate heat in us, ought not to be refuted, but laughed at, ſince it is obvious to the ſenſe of every one; and in oppoſing thoſe who derive the heat of the blood from its motion he ſays; *Provoca ad experientiam totius naturæ rerum. Moveant mihi & conquaſſent quemcumque humorem, & fluctus in ſimpulo concitent integros dies noctesque, æſtuet mare, fluvii rapidiſſimi per immerſas rupes provolvantur integra ſæcula, ne tepeſcent quidem unquam, multò minus calebunt. Numne igitur vident, aliud quam motum eſſe, a quo caleat ſanguis? etſi motu calor ille augeatur.* "Let "us appeal to experience throughout the whole "nature of things. Let me ſhake and agi- "tate any kind of humour in a cruet even "whole days and nights, or even though "the ſea and moſt rapid rivers fluctuate, and "run

[k] H. Boerh. Chem. Tom. I. pag. 176.

[l] De genuina febres curandi methodo, Sect. II. § 33. p. 91.

" run ſwiftly over immenſe rocks for whole " ages together, yet will they never become warm, " much leſs will they grow hot. Is it not there- " fore plain that there is another principle than " motion by which the blood grows hot? " even though this heat is increaſed by motion." But it muſt be obſerved that heat is not raiſed by every kind of motion in bodies, but only by ſuch wherein the bodies mutually reſiſt or act upon each other, more eſpecially if the bodies are elaſtic. Hence therefore heat may be excited in fluids by attrition, if they are elaſtic; but if they are not elaſtic, it will be difficult to effect this: Hence it is that water ſo difficultly grows hot by attrition. Yet milk, being ſwiftly agitated and ſhook, grows warm, as country people know by daily experience, when they make butter of it. But even if fluids not elaſtic, are urged with a great force through very ſmall veſſels, they will grow warm by attrition, and much more if the tubes through which the liquors are drove are elaſtic [m]. But it appears from the obſervations of Leeuwenhoeck, ſince confirmed by others, that our blood contains a great quantity of elaſtic ſpherical particles; for the red blood globules, arriving at the ultimate extremities of the ſanguiferous arteries, paſs thro' by one at a time, and with ſome difficulty, ſo that they often change their ſpherical, into an oval figure, as they are ſqueezed through the mouth of the artery into the vein; but when they have paſſed this ſtreight, and arrived into a larger diverging veſſel, they recover their priſtine figure; the truth of which may be ſeen to the eye with a microſcope, by viewing the pellucid membranes of living animals furniſhed with red blood. Our blood therefore is compoſed of elaſtic particles, and moved through elaſtic arteries; concerning the truth

[m] H. Boerh. Chem. Tom. I. pag. 197.

truth of which no one can doubt, If again, we conſider that the fluid conſiſting of theſe elaſtic parts, is drove through elaſtic veſſels of a converging or conical figure, and with a very ſwift motion, it will be evident that the particles of the fluid will be every moment changing their direction, ſtriking againſt each other, and againſt the ſides of the veſſels, ſo as to ſuffer a great attrition. Moreover, in the ultimate narrow extremities of the ſanguiferous arteries, the thinner parts of the blood eſcaping through the lateral ſecretory veſſels, there remain hardly any but the red globules; and theſe laſt paſs even with ſome difficulty through the artery into the vein, by one at a time, in ſuch a manner that they come into contact with the ſides of the artery; and therefore in theſe parts will happen a violent attrition of two elaſtic bodies, from which attrition we know heat ariſes.

All that has been ſaid is fairly confirmed by the appearances obſervable in diſeaſes, when the fluids or ſolids, or both, degenerate from their healthy conditions. For when a great part of the red blood has been exhauſted by profuſe hæmorrhages, the heat of the body proportionably decreaſes, as the native heat of the body is alſo diminiſhed in thoſe, who inſtead of firm blood, have their veſſels filled with inactive water or a yellow greeniſh ſharp ſerum, as in girls afflicted with the green ſickneſs; and likewiſe where there is obſerved a too weak coheſion in the ſolid parts of the body, whence there is a leſs action of them upon their contained fluids, and conſequently a leſs attrition. For the red parts of the blood conſiſting of the largeſt ſpherules contained in our humours, and moved through the largeſt veſſels of the body, are the beſt diſpoſed to produce heat by attrition, and to retain the heat longeſt after it is once raiſed.

For the more denſe the matter of which any body is compoſed, or the greater its bulk, and the more exactly ſpherical its figure, ſo much the more is it diſpoſed to retain fire or heat a longer time in itſelf[n]. But all theſe properties are obſerved chiefly in the red particles of the blood, if we compare them with the other conſtituent parts or elements of our humours. For this reaſon the veſſels full of red blood, are placed in thoſe parts of the body, where the thinneſt fluids pervade the ſmalleſt veſſels, to ſupply the deficiency of heat in the latter. Thus we know there is a great number of blood-veſſels, diſperſed thro' the medullary part of the encephalon, encompaſſing the medulla oblongata, and diſtributed through the plexus choroides in the ventricles of the brain, *&c.* But ſo long as in the incipient animal, there is not ſtrength enough in the ſolid parts, to excite a due heat and attrition in their contained fluids, that defect is ſupplied by the warmth of the mother's body in which they are contained, or elſe by the heat of incubation.

Since therefore our natural heat depends on the mutual attrition of the parts of the fluids againſt each other, and againſt the ſides of the veſſels, therefore heat in fevers is juſtly aſcribed to an increaſe of the ſame cauſes. But from whence this increaſe ariſes we are next to enquire.

[n] H. Boerh. Chem. Tom. I. pag. 278.

SECT. DCLXXVI.

BUT this more violent attrition proceeds from a greater motion of the parts of the fluids ſent from the heart, and from a great reſiſtance of the veſſels againſt the heart.

The heart propels its contained blood into the arteries, and therefore the motion given to the blood from the heart is the force whereby that fluid ſtrikes againſt the ſides of the arteries, and againſt the other parts of the blood already contained in thoſe veſſels. For the arteries are always full, as well in their contraction as dilatation, and therefore the blood, already contained in the arteries at the time when the heart empties its cavities into them, makes reſiſtance, nor can the full arteries be able to receive the blood drove into them by the heart, unleſs they are either dilated, or a portion of their contained blood tranſmitted through them into the veins, ſo as to make way for that which is to ſucceed; or unleſs both of theſe are effected at the ſame time. If therefore the veſſels are ſo firm as powerfully to reſiſt dilatation, and remain very full in their ultimate contraction, either from the quantity of the blood, or the difficulty of its paſſing through the ultimate extremities of the arteries; in that caſe the fluid contained in the arteries will be preſſed by two oppoſite powers, namely, the action of the heart urging from the baſis towards the apex of the converging veſſel, and thoſe reſiſtances which may be likewiſe conſidered as powers acting with an oppoſite motion and direction from the apex towards the baſis; hence there muſt happen a very great compreſſure

f the fluid contained in the arteries, which will gain urge itſelf with great force againſt the ſides f the arteries themſelves. If therefore the powers f the heart are ſo great, as to overcome theſe reſtances however conſiderable, the blood will be ioved through the arteries, and ſuffer a violent trition againſt their ſides; but otherwiſe, if the orce of the heart was not ſuperior, the motion of ie blood would be ſuppreſſed. But when the ction of the heart ceaſes, the diſtended arteries, by ieir own elaſticity and contraction of their muſcur fibres, re-act again with an equal force upon ieir contained blood, and urge it forward; and ierefore the compreſſed blood will ſuffer an attrion with an equal force from the ſides of the aries, and the globules themſelves, being preſſed owerfully againſt each other, as they move along irough a converging veſſel, will ſuffer a mutual trition againſt each other, as they are every moient changing their places. But attrition is alays the more violent, as the bodies rubbing are iore forcibly preſſed together: But ſince from ie increaſed motion of the blood from the heart, id the great reſiſtance of the veſſels, there muſt llow a violent preſſure of the veſſels againſt their ontained fluids, and of the parts of the fluids aainſt each other, it is evident that the attrition ill become more violent, and conſequently its ffect, namely, a greater heat, muſt enſue.

SECT. DCLXXVII.

THE great motion of the blood propelled from the heart is eſtimated from the denſity of the propelled fluid, and its velocity through the veſſels.

Motion in itſelf, ſo far as it is conſidered in a moving body, we call force or impetus, namely that which diſtinguiſhes the body from another of the ſame kind at reſt, and by which the body acquires a faculty of acting upon or againſt ſome obſtacle or reſiſtance [o]. But the inherent force or powers in moving bodies, differ according to the quantity of their matter or denſity, and the velocity with which they move [p]: from whence mathematicians have demonſtrated a general rule for comparing forces, namely, that the powers in moving bodies are in a ratio compounded of their maſſes, quantity of matter, and the ſquare of their velocity. The motion of the blood therefore, driven forward by the heart, may be meaſured by the ſame rule. (For although very great philoſophers differ in their opinions concerning this matter, yet the truth of what is affirmed in the text, is equally demonſtrable from the opinion of others.) But the greater or leſs denſity of the blood, ſuppoſes a greater or leſs quantity of matter contained in it: for the quantity of matter in a body, conſidered with reſpect to its bulk or the ſpace which it occupies is called the denſity of the body [q]. By theſe two therefore, namely, the denſity of the blood and its velocity through the veſſels, may be eſtimated the motio

[o] Graveſande's Element. Phyſic. Tom. I. pag. 196.
[p] Ibid. pag. 213. [q] Ibid. pag. 417.

notion of the blood driven out of the heart, and consequently the force which it exerts against the sides of the arteries, and against the blood already contained in them: all which was necessary to be premised here from the principles of mathematical learning.

SECT. DCLXXVIII.

THE denſity of the blood is known from the appearance of it when extravaſated, from a diſſipation of its more rare or light particles preceding, and from the hardneſs of the pulſe.

The chyle prepared from the aliments is always leſs denſe than our blood; and therefore, when mixed with it, it floats upon the ſurface, as is evident when a healthy perſon is bled four or five hours after a meal (ſee the comment to § 80); but after the chyle has circulated with blood for ſixteen or more hours, and ſuffered the actions of our veſſels, it loſes its own nature, and is changed firſt into ſerum and then into blood, and by that means acquires a greater denſity. But, as this denſity acquired depends upon the action of the veſſels on the fluids, it is evident that a greater denſity in the human fluids is to be expected, if the condenſing cauſes are more powerful. Therefore in ſtrong and exerciſed men the blood is always more denſe than in the weak and idle; and therefore we may certainly foreſee ſuch a denſity of the blood from a known habit of the body. Moreover, if the blood itſelf, being diſcharged either by a ſpontaneous hæmorrhage or the opening of a vein, can be examined by the eye and touch, we may

eaſily judge of its denſity, which is known fro the greater or leſs degree of concretion in th blood. The blood taken from the vein of ruſtic daily exerciſed with hard labour, almoſt i ſtantly congeals into a ſolid maſs, and after ſom hours ſtanding, only a ſmall quantity of ſerum ſe parates from it: but, on the contrary, if a wea girl is let blood, the whole continues fluid for ſom time, and afterwards a great quantity of a thin ſe rum ſwims above a ſmall cake or iſland of the re cruor.

Another ſign by which we know that the bloo has a greater denſity is, when it appears to have lo its moſt thin and fluid parts, expelled from the bo dy by urine, ſweats, a diarrhœa, *&c.* for then th remaining blood muſt of neceſſity become mor denſe, as is very apparent. Whence alſo in acut diſeaſes, Hippocrates ſo much condemns the waſt ing of the more fluid parts of the blood; this like wiſe Sydenham obſerves, which we took notice o before upon another occaſion. (See § 386. an 590.)

The hardneſs of the pulſe is likewiſe a ſign of th denſity of the contained humours. And the pulſ is ſaid to be thus hard, when it ſeems to the touc of the finger, as if a ſolid body was protrude thro' the artery, and at the ſame time the arter violently reſiſts the preſſure of the finger. Henc the pulſe is always harder in robuſt and exerciſe people, and ſofter in thoſe who are weak; and i inflammatory diſeaſes, where a greater denſity o the blood attends, a hardneſs of the pulſe is reck oned among the principal ſigns, as we ſhall declar hereafter.

SECT

SECT. DCLXXIX.

THE velocity of the blood is computed from the number of the contractions of the heart compared with the magnitude of the pulse.

The celerity of the blood through the veſſels is increaſed, when the powers moving that fluid act with a greater force, or are applied oftener to the blood in a given time. But the contraction of the heart, when it expels its contained blood into the arteries, communicates its motion to that fluid, by which the arteries always full are dilated, and the blood is preſſed through their extremities into the veins. But when the heart is in its dilatation, the arteries by their elaſtic and muſcular force re-act again upon the blood which diſtends them, and by that means urge it forward. If therefore the contractions of the heart are increaſed in their number in a given time, we know that the powers moving the blood are applied oftener in a certain ſpace. But yet for the celerity of the blood to be thence increaſed, it is required likewiſe for the more frequent contractions of the heart to be ſo ſtrong, as to be able to propel all the blood contained in its cavities into the arteries. For in the cold fit of a fever the contractions of the heart are indeed very quick, as they alſo are in dying animals; and yet the celerity of the blood's motion through the arteries is not increaſed, becauſe the contractions are at that time weak or imperfect. But the magnitude of the pulſe of the arteries denotes that they are powerfully diſtended, by a great quantity of blood expelled into them from the cavities of

the heart at each of its contractions; and therefore if a large pulſe is accompanied with a more frequent action of the heart, we know for certain that the moving powers are ſtrong, and oftener applied in a given time to the blood, and conſequently that the velocity of this fluid is increaſed. But the magnitude of the pulſe is meaſured by the difference to be obſerved betwixt the diaſtole or dilatation of the artery, and the ſyſtole or contraction of it; for the greater this difference, the pulſe is ſaid to be ſo much the larger; for the pulſe may be full without being great, as when the arteries being filled with blood cannot empty themſelves for the increaſed reſiſtance which is made to their extremities; and then the contraction of the pulſe will appear ſmall, becauſe the artery cannot leſſen its diameter without expelling the blood from its cavity. But ſince the dilatation of the artery is made at that time when the heart is contracted, and the artery contracts when the heart is dilated, it is evident that a greater quickneſs of the pulſe denotes a more frequent action of the heart; and therefore a quick pulſe, which is alſo large, demonſtrates that the velocity of the blood is increaſed.

SECT.

SECT. DCLXXX.

A GREAT reſiſtance againſt the heart is known from the quantity and inertia, (thickneſs or reſiſtance) of the ſolid or fluid parts to be moved; and from the fewneſs, narrowneſs, or immobility of the veſſels, through which the humours are to be tranſmitted.

When the heart propels the blood contained in its cavities into the arteries, which are always full, thoſe veſſels muſt be dilated to receive the blood; or if they are not dilated, ſo much of the blood ought to paſs out of the arteries into the veins, as is equal to the quantity driven by each ſtroke of the heart into the arteries. But both theſe we know are performed in the living animal; for the arteries are dilated during the ſyſtole of the heart, and at the ſame time a portion of the blood is expelled from the arteries into the veins, as we are aſſured from the uninterrupted motion of the blood through the veſſels. The heart muſt therefore, by its muſcular force urging the blood into the full arteries, move all the maſs of blood which they contain: for at the time when the heart is contracting, the arteries are dilating; and therefore they will not act by their elaſticity and muſcular force at that inſtant upon their contained blood. If therefore the maſs of the fluid to be moved lodging in the cavity of the arteries is increaſed, it is evident the reſiſtances to the blood to be expelled from the heart into the arteries will be increaſed. But the greater the ſpace is into which the heart has an opportunity of expelling the blood contained

in

in its cavities, the more eaſily will it be emptied, and the leſs reſiſtance will it meet with. Hence therefore if the diameters of the arteries are diminiſhed by any cauſe, or if the number of the ſmall pervious arteries is leſſened, it is again very evident that the reſiſtance muſt increaſe. But ſince the arteries are converging veſſels full of incurvations, the blood expelled from the heart muſt ſtrike againſt their ſides, and conſequently remove them from the axis, ſo as to enlarge the capacity of the veſſels, and make a ſpace for the blood about to enter next into them. If therefore the ſides of the arteries are ſo firm as not to yield eaſily to the blood impelled from the heart; from thence again the reſiſtance will be increaſed. Hence appears the reaſon why in weak people there ariſes ſo great an anguiſh from too tight cloathing; for many of the ſmall veſſels being compreſſed, the reſiſtance is increaſed to the weak powers of the heart; but they are immediately relieved by relaxing their cloaths. The reaſon is alſo evident, from what has been ſaid, why weak people, and thoſe who are recovering after violent diſeaſes, are ſo often oppreſſed with great anxiety by taking a large quantity of food or drink; ſince the maſs of the humours to be moved, being ſuddenly increaſed, augments the reſiſtance to the heart. But when the heart has force enough to overcome this increaſed reſiſtance, there ariſes a feveriſh heat from the greater attrition after a large meal, as it alſo happens from a violent compreſſure of the body; and from hence the robuſt are ſo well able to bear the winter's cold by tight cloathing.

SECT.

SECT. DCLXXXI.

THE maſs of humours to be moved is perceived to be great, by ſigns of a plethora (§. 126.) or cacochymy, or from humours being ſuddenly diſſolved and put into motion, which were before ſtagnant, as in fat people; but more eſpecially a turgeſcence of the veins, with a large and ſwift pulſe of the artery at the ſame time, denote the maſs preſent to be great.

All the humours, which being received by the veins are returned to the heart, from whence again they are diſtributed by the arteries, belong to the maſs to be moved. The quantity of the blood therefore being increaſed, however healthy, will increaſe the maſs to be moved; and when this increaſe is grown to ſuch a degree that ſo much good blood abounds that it cannot undergo the changes which are inſeparably joined to life, without inducing diſorders, it is then called a plethora (ſee § 106.) The preſence of which is known from a greater redneſs of the body, and a great heat with the other ſigns before enumerated § 106 ε. But a great heat attends in plethoric people, becauſe the reſiſtances to the heart being increaſed, the attrition is likewiſe increaſed; and becauſe the red part of the blood abounds, which is moſt diſpoſed to generate heat by attrition, and to retain the heat when generated, as we ſaid before at § 675.

But the quantity only of good blood being increaſed is called a plethora, and not any increaſe of the humours whatever can be thus called, as we ſaid before from Galen in the comment to

§ 106

§ 106. *a.* For when the humours abound in quantity, but ſo degenerate from the nature of healthy fluids as to injure the functions, it is then termed a cacochymy. Thus in the leucophlegmatia or pale diſeaſe of virgins, the body is ſwelled with unactive and mucous humours, and the maſs to be moved ſo much increaſes, that they are almoſt ſuffocated by the leaſt exerciſe or muſcular motion, although there is but very little good blood preſent in ſuch bodies. But it is evident that the reſiſtances to the heart may be increaſed by ſuch a cacochymy, upon the account of the increaſe of the maſs to be moved.

It is to be well obſerved, that not all our humours are perpetually moved through the veſſels, but that there are ſome, and often in a great quantity, which, being ſeparated from the blood, and collected in cavities for that purpoſe, are reſerved for their particular uſes; and which, if they are not conſumed, are often accumulated in very great quantities, ſo as greatly to oppreſs and load the body. This is more eſpecially true of the fat, a due quantity of which has very good uſes to ſerve in the body, ſuch as to cover and defend parts, and retain them flexible and fit for motion, &c. for which reaſon the fat is placed not only round all the muſcles, but alſo betwixt their ſeveral fibres and bundles of fibres. But when the body is daily exerciſed by muſcular motion, this collected oil is attenuated and returned into the veins, and thus, mixing with the blood, is diſcharged from the body either by urine or ſweats. But when animals are idle, or not ſufficiently exerciſed, and in the mean time uſe a plentiful diet, this fat or oil is accumulated in the cellular membrane, and, by increaſing its quantity, compreſſes all the adjacent veſſels: and from hence there is often not ſo much

blood

blood in fat as in lean people, as we are assured from the smallness of the pulse and of the veins in the former. But when the heat and motion of the humours is increased by a fever, the accumulated fat is dissolved, and, entering the veins, is conveyed together with the blood to the heart; hence the mass of humours to be moved is suddenly increased, and often so great a plethora is raised, that the vessels burst, extravasate their humours, and sudden death ensues. For this reason an agitation of the stagnating humours is justly ranked amongst the effects of a fever (§ 587.) For if a fat person lies ill of an acute continual fever for fourteen days, he sometimes loses half the weight of his body within that space, which loss proceeds mostly from the consumption of the fat by the fever; for fat people, recovering after such diseases, appear perfectly lean and fallen away. It is therefore evident how much the mass to be moved may be increased from a dissolution of the fat by a fever. But how great difficulty often arises from hence in the cure of diseases, will be explained hereafter at § 693.

But the principal sign of too great a mass to be moved, is a large and quick pulse of the artery, while at the same time the veins are turgid, as if they were inflated; for then we know that all the blood-vessels are extremely full. For the pulse of the arteries may be sufficiently large and quick, though in the mean time there is no increased quantity of the liquid to be moved, namely, if the blood thickened with an inflammatory density passes more difficultly through the extremities of the arteries; but then the veins are emptied, because they receive less, and almost all the blood is accumulated in the arteries, as hath been frequently observed in opening the bodies of those who have

died

died of acute inflammatory diſeaſes. But on the contrary, in languid diſeaſes the humours are often accumulated in the veins, which are more eaſily diſtended, while in the mean time there is a leſs quantity of them flowing through the arteries. But, when both the arteries and veins are turgid at the ſame time, we know for certain that the maſs of humours to be moved is increaſed. But for a greater quantity of humours to flow in the ſame time through a like number of veſſels, the celerity of the moving liquid muſt of neceſſity be increaſed; and therefore in this caſe there will be alſo a quickneſs of the pulſe. Yet it muſt be obſerved, that in a great plethora almoſt all the motion of the blood is ſuffocated by the too great maſs to be moved, whence the increaſed heat and quickneſs of the pulſe are ſcarcely obſervable; and therefore in ſuch a caſe the abſence of this ſign may deceive a perſon. A remarkable inſtance of this is given us by Sydenham[r], which we mentioned upon another occaſion, in the comment to § 590. A young man ill of an acute fever ſeemed to be almoſt expiring; but the heat in the mean time was perceived to be ſo moderate in the extreme parts of the body, that his friends, who attended him, did not believe he had a fever. But blood being plentifully drawn by opening a vein, the fever raged ſo forcibly, that Sydenham confeſſes that he never ſaw one more violent, though it yielded to a third or fourth bleeding. But ſuch a ſuffocation of the blood's motion attends only in the greateſt degree of a plethora, which a ſkilful phyſician can eaſily diſcover by its proper ſigns.

[r] In Schedula monitoria de novæ febris ingreſſu, p. 683.

SECT.

SECT. DCLXXXII.

THE paucity of the veſſels pervious may be known from the hiſtory of obſtruction, (§ 107, to 124.) and of wounds, (§ 145, to 331.)

When the veſſels are ſo obſtructed by an impervious humour, that they are able to tranſmit nothing, they then continue diſtended before the obſtructed part, from the impetus of the vital liquid urging againſt the obſtructed veſſel; but that part of the liquid which is lodged beyond the obſtruction paſſes on into the veins; and therefore that whole length of the veſſel which is intercepted betwixt the obſtruction and the vein will remain empty. If therefore this obſtruction takes place in many of the veſſels, the number of the tranſmitting canals will be leſſened, while in the mean time the maſs of the liquid to be moved remains the ſame; the reſiſtance therefore to the blood propelled from the heart will be increaſed, and the liquids muſt conſequently paſs more ſwiftly through the canals as yet open, ſo long as the circulation of the humours is carried on through the veſſels. But it is very evident, that both the reſiſtance and celerity of the motion ariſing from this cauſe muſt produce a conſiderable effect, if the number of the impervious veſſels be great, compared with thoſe which remain open. See what has been ſaid under the head of obſtruction, eſpecially in the comment to § 120, as alſo in the comment to § 382. N°. 8. concerning the effects of inflammation. But it is evident enough that the ſame things happen, when great numbers of the pervious veſſels are deſtroyed by

by wounds; more eſpecially when a great portion of the body has been removed by amputating or cutting off a limb (as was demonſtrated at § 474); and then the effects of a plethora frequently follow.

SECT. DCLXXXIII.

A Narrowneſs of the veſſels is known by inſpection, by the touch, and the patient's habit being dry, ſo as to produce a great increaſe of heat from a ſmall increaſe of motion.

The veſſels appear conſpicuous in many parts of the body, whence we may have an opportunity of judging by inſpection concerning the increaſe or diminution of their capacity. For the veins, even very large ones, are placed in the ſurface of the body; and in the lips, internal parts of the mouth, white of the eye, &c. the arterial veſſels, however ſmall, lie expoſed to view. But the larger arteries are more deeply buried for their ſecurity. But we are more eſpecially able to judge concerning the diminiſhed capacity of the veſſels, from the decreaſe, fulneſs, or bulk of the conſpicuous parts. For the greateſt part of the bulk of the body ariſes from the fluids diſtending the veſſels; and therefore as ſoon as the veſſels are ſtrengthened, all the parts ſhrink up, or contract: thus we ſee in a ſudden and great fright, that the face is wonderfully agitated, the lips are contracted, the eyes and cheeks look pale, ſo that the ſtraightened or contracted veſſels no longer admit the red blood by which they are uſually pervaded. But we are likewiſe able to diſtinguiſh the greater or leſs capacity of

of the arteries in many parts of the body by the touch; namely where the larger arteries come neareſt to the ſkin or ſurface of the body, eſpecially if they lie upon bones, as in the wriſts and temples, where we moſt plainly diſtinguiſh the pulſe of the arteries. But ſince the capacity of our veſſels is meaſured by a ratio compounded of the force of the impelled liquid directly, and of the reſiſting ſides inverſely (ſee § 26); it is therefore evident that the veſſels may be ſtreightened, if the force impelling the fluids into them is diminiſhed, or the reſiſtance of them, by which they contract, increaſed. The firſt cauſe of a narrowneſs of the veſſels is known from the ſigns of a weakneſs in the heart; but the latter is known by thoſe ſigns which accompany an increaſed elaſticity of our veſſels. For if the quantity of liquids to be moved continues the ſame, while the veſſels are rendered more narrow, anguiſh, palpitation of the heart, &c. will immediately attend, as we always obſerve in one ſtruck with great fear. But we are here to treat chiefly of the latter kind of narrowneſs in the veſſels, namely when the contractile force of their ſides is ſo much increaſed as to leſſen their capacity; that is to ſay, when the ſolid parts of the body overpower the fluids; for then a dry habit is ſaid to attend, which is uſually accompanied for the moſt part with a greater heat, and always with leanneſs [s]. Hence we may likewiſe underſtand why people of a lean and dry habit often grow hotter by repletion, and more eaſily bear the external cold of the atmoſphere. But when the veſſels are rendered narrow, the quickneſs of the circulation is at the ſame time increaſed, becauſe the veſſels do not ſo eaſily yield or dilate; whence a great attrition muſt follow of the humours and ſides of the veſſels, and

[s] Herm. Boerhaave, Inſtit. § 892.

conſequently a great increaſe of heat will enſue: for when a greater quantity of blood is urged into the arteries in the ſame ſpace of time, if they are contracted and leſs eaſily dilatable, all that blood muſt move with a greater celerity, and be preſſed into the veins, and therefore the attrition will be increaſed. Hence the reaſon is evident why there is ſo great an increaſe of the heat, when thoſe who have a pulmonary conſumption, are troubled with a ſlight fever after meals; becauſe in theſe greatly emaciated bodies the veſſels are very narrow or contracted. And hence the quantity and velocity of the liquid to be tranſmitted being increaſed, will immediately augment the attrition to a conſiderable degree, whence the pulſe in the arteries of theſe is obſerved quick and ſmall. From hence likewiſe we have another reaſon why acute and inflammatory diſeaſes are ſo fatal to ſtrong and exerciſed bodies (ſee the comment to § 386, and 588.) For in theſe the rigid and more narrow veſſels immediately produce a great heat from the increaſed motion of the circulation; whence follows a diſſipation of the moſt fluid parts of the humours, and a converſion of the remaining maſs into an impervious and irreſolvable matter (ſee § 689;) hence the inflammation increaſes, and all its worſt conſequences follow in a ſhort time.

SECT. DCLXXXIV.

AN immobility of the veſſels greatly reſiſting their dilatation, is known from all the ſigns of rigidity in the fibres, veſſels, and viſcera (§ 32, 33, 34, and § 50 to 54.)

A narrowneſs of the veſſels, ſo far as it is to be ranked amongſt the cauſes of heat, always ſuppoſes

poſes that they are leſs moveable, or more powerfully reſiſt their dilatation. For we do not here conſider that narrowneſs of the veſſels which ariſes from a diminution either of the quantity or impetus of their diſtending liquid; becauſe by ſuch a narrowneſs heat is not produced, ſince the attrition cannot be increaſed thereby. But this immobility of the veſſels we here conſider ariſes from a greater coheſion of the ſolid parts; concerning the ſigns and cauſes of which we treated at the numbers here cited in the text.

SECT. DCLXXXV.

FROM ſo many proximate cauſes (§ 674 to 685) does the origin of heat in fevers proceed; which proximate cauſes may again proceed from an infinite number and variety of other more remote cauſes.

We have now enumerated in order the proximate cauſes of heat in fevers, and diſtinguiſhed their ſeveral kinds, that we might be afterwards able to deliver the cure of each; and it appears that however different they are, yet they all conſpire together in this, that they produce a more violent attrition of the fluid parts againſt each other, and againſt the veſſels, and of the veſſels againſt them. But theſe proximate cauſes of heat again acknowledge others for their proximate cauſes, which with reſpect to the febrile heat are only remote cauſes. Of theſe there is a great number, and almoſt an infinite variety, and therefore it would be of no uſe to enumerate them, ſince it is ſufficient for the cure of the febrile heat, to remove its proximate cauſes, and theſe being rightly underſtood, it will be eaſy to diſcover the remote cauſes, if at any

time the knowledge of them is neceſſary. Thus, for example, the maſs of humours to be moved being increaſed, has been reckoned among the cauſes of heat in fevers, of which again there may be various cauſes, according as it ariſes either from a plethora, different kinds of cacochymy, or from ſtagnant juices put in motion. But for the cure of febrile heat ariſing from this cauſe, it is ſufficient only to leſſen the maſs to be moved, without having any regard to the remote cauſes of the plethora or cacochymy. The ſame is alſo true of the denſity of the blood, its velocity, *&c.* It is likewiſe evident from what has been ſaid, that the cauſes of heat in fevers, ſo far as they reſide in the fluids, may be reduced either to their quantity, denſity, or motion increaſed through the veſſels, but in the ſolid parts theſe cauſes depend on a diminution of the number of the tranſmitting veſſels, while there is the ſame quantity of liquid to paſs through them, or elſe on a greater narrowneſs or immobility of them, by which they reſiſt the dilatation of themſelves from the impelled fluids. At the ſame time it is likewiſe evident that what ſome authors have ſaid concerning putrefaction, fermentation, effervescences, or the like, as the productive cauſes of heat in fevers, is vain and without foundation. For if, as Helmont well obſerves, this heat aroſe, for example, from putrefaction [t], *Cadaver caleret poſt mortem, & febri torqueretur ardentius, quam dum viveret; eo quod eadem numero materia, cujus obſequio mors advenit, etiamnum perſtet in cadavere: cumque eam ſupponunt calidam, proprio putredinis calore, magiſque fit putrida per mortem, ut & potentius a morte putrefaciens, pluresque afficiat partes ſibi conterminas, quam dum viveret: idcirco etiam plus actualiter caleret poſt mortem, quam in vita.*

At

[t] De Febribus, cap. 1. pag. 741, N°. 24, &c.

At ſane hic error proditur. Nam febris, quæ vivum calefecit, ſtatim cum vita ceſſat, omniſque calor cum vita exſpirat. Unde concluſit, quod, *quidquid in ſanis edit actiones ſanas, id ipſum in morbis edit actiones vitiatas.* "The dead body would grow "hot after death, and be tortured with a more "ardent fever than while it was living; and this the "more, becauſe there is the ſame quantity of mat-"ter, in conſequence of which death comes, whe-"ther it continues in the body or not: and as "the dead body is ſuppoſed to be hot by its own "heat from putrefaction, it will become more pu-"trid after death, ſo as to corrupt more power-"fully and affect more parts when the body is "dead than while it was living: for which reaſon "it ſhould be actually hotter after death, than while "it was living. But this is in reality an error im-"poſed upon us. For the fever which heats the "living body immediately ceaſes together with "life, and all its heat likewiſe expires together. "Therefore we may conclude that whatever the "actions produce in healthy people who are well, "the ſame effects do thoſe actions likewiſe produce "ill when they are vitiated in diſeaſes." Since therefore heat in healthy people proceeds from an attrition of the fluids againſt the veſſels, and againſt each other, and of the veſſels againſt them, the increaſe of the healthy heat in fevers is to be aſcribed to the ſame cauſes, only more violent. Hence alſo medicines which are called heating do not render the body hotter when they are applied to it, becauſe they contain more heat in themſelves, which they communicate to the body; but becauſe by a powerful ſtimulus they increaſe the motion, and conſequently the attrition of the humours through the veſſels. For the fiery hot pepper, oil of cinnamon, and the like, examined by the thermometer,

have the ſame heat with the ambient air, and although they are applied in great quantities to a dead body, yet they do not produce any heat.

SECT. DCLXXXVI.

BUT the febrile heat may increaſe from an augmentation only of one of theſe cauſes, and then the increaſe of the heat will be in proportion to the augmentation of the cauſe.

Since therefore the cauſes of heat in fevers may be conſidered abſtractly, and one of them may be conceived alone without the reſt, it is evident that a greater effect ought to follow from the increaſe of ſuch a ſolitary cauſe, ſince every effect is proportionable to the cauſe from whence it is produced. If therefore the denſity of the blood be ſuppoſed double in a febrile patient, the increaſe of the heat ariſing from that cauſe, muſt be in the ſame proportion; and the ſame is apparently true of the other cauſes ſeparately conſidered. But it is very rarely that the ſolitary or individual cauſes of the febrile heat remain long alone; for the denſity of the blood being increaſed, for example, from a previous diſſipation of its more fluid parts, its impervious particles will ſoon heſitate in the ultimate extremities of the arteries; and therefore the reſiſtance to the blood about to flow through the veſſels will be increaſed; and therefore there will be likewiſe an increaſed heat from the increaſed reſiſtance. Thus alſo the velocity being increaſed will be ſoon followed with a greater denſity in the blood,

as

as it was demonſtrated in the comment to § 100. But it ſhould be obſerved that in this computation the increaſe of the heat is not always in the ſame proportion to the increaſe of the particular cauſe; but as the augmentations of theſe cauſes are to each other, ſo does the exceſs of the heat ſeem to be which they produce above the natural healthy degree. This may perhaps appear more evident by example. If the celerity of the blood is double when the artery of a febrile perſon beats twice in the time, wherein during health it beats only once, the heat in this caſe ought not to be double; for beſides the velocity of the motion, there are other cauſes which conſpire to produce the healthy heat, namely, the denſity and elaſticity of the blood, the ſtrength and narrowneſs of the veſſels, &c. which do not always increaſe in proportion with the velocity of the blood. Even it is very apparent that if the quickneſs of the blood's motion was increaſed in this manner, there would not only enſue a degree of heat intolerable to the human body, but ſpeedy death likewiſe. For if the heat which in a healthy perſon exceeds the ninetieth degree of Fahrenheit's thermometer, was to become double, that is, to exceed one hundred and eighty degrees of the ſame thermometer, the blood and its ſerum would be coagulated in the veſſels, and conſequently all their motion would ceaſe: But yet in the mean time we obſerve in fevers, and in people exerciſed by hard running, that the velocity of the blood is increaſed more than double. But in comparing the increaſe of heat from the augmentation of the particular cauſe, it ſeems to follow that the exceſs of the heat above the healthy degree, which ariſes from a duplicate celerity in the motion of the blood, is, to a like exceſs of heat ariſing from a triplicate celerity, as one to two; namely, in

the ſame ratio as are the exceſſes of the velocity with reſpect to each other. But concerning theſe proportionable augmentations of the particular cauſes of heat, and their effects, there is room for much diſputation, though for the uſes of the phyſician the various intenſity of the febrile heat may be better known from thoſe ſigns, concerning which we treated before at § 673. For there will be always the greateſt difficulty attending the determination of the particular cauſes which ſerve to augment the heat. However, we know how to diſtinguiſh the increaſed velocity, by the number and magnitude of the pulſe, or by comparing the number of the heart's contractions with the ſize of the pulſe; but in what degree the denſity of the blood is increaſed, in what the inertia or maſs of the liquid to be moved, with the elaſticity of the canals; or what proportion are there of impervious veſſels, with reſpect to thoſe that remain open, *&c.?* hardly any one will pretend to determine. Who again can diſtinguiſh how much the denſity of the blood contributes to increaſe the heat, or how much the velocity of its motion, and how greatly the reſiſtance of the liquid to be moved, *&c.?* We are indeed able to diſtinguiſh the heat ariſing from all theſe concurring cauſes, but, how much each of theſe contribute to produce this effect, I believe we are ignorant. Moreover, by the heat raiſed, thoſe cauſes are changed which produce it; for the globules of the blood have their bulk increaſed by heat, while their maſs or matter continues the ſame, and therefore their denſity is diminiſhed, while the capacity of the canals is increaſed by the heat generated, and therefore in this reſpect the reſiſtances are leſſened, *&c.* Hence therefore in the general we may affirm, that the heat is augmented when its particular

cauſes are increaſed, other things continuing in the ſame ſtate; and when we conſider theſe cauſes abſtractly, we may be able to make a computation: but, in the concrete, when all the cauſes concur together, to determine any thing in this reſpect muſt be extremely difficult, if not wholly impracticable.

SECT. DCLXXXVII.

IF again two of theſe cauſes increaſe together, the increaſed heat will be as the product of the increments of the cauſes, if they are multiplied by each other.

SECT. DCLXXXVIII.

WHICH calculation may alſo take place in the ſame manner in the reſt of the cauſes.

If now ſeveral cauſes increaſe together, the heat will doubtleſs be increaſed, but by the reaſons before explained it will be very difficult to know in what proportion the increaſe is made. Hence we may underſtand why ſtrong and exerciſed bodies are in ſo much danger when they are taken with acute diſeaſes. For the veſſels being rigid in theſe patients, greatly reſiſt the heart, while the denſe humours ſtrike and rub more impetuouſly againſt each other, and againſt the ſides of the veſſels, and longer retain the heat which is once raiſed, while at the ſame time the velocity of the humours through the veſſels is increaſed by the fever. From whence it is evident that the moſt effectual cauſes concur in ſuch patients, whereby a great heat is produced.

SECT.

SECT. DCLXXXIX.

THE increaſed heat diſſipates the moſt fluid parts from our blood, that is to ſay, the moſt ſpirituous, watery, ſubtile, ſaline, and oily particles, while it dries, condenſes, and inſpiſſates the reſt into an impervious, irreſolvable matter; it ſets at liberty the ſaline and oily parts, attenuates and renders them more acrid, exhales, and puts them in motion; hence it grinds away and breaks the ſmalleſt veſſels, dries up the fibres, and renders them rigid and contracted; from hence of a ſudden it produces many ſwift, dangerous, and fatal diſeaſes, which are eaſily deducible from an increaſed heat as the cauſe.

We come now to treat of the effects, which are obſerved to follow from an increaſed heat, as well in the ſolid as fluid parts of the body. But we do not here ſo much conſider what the cauſes producing heat can effect; for when the cauſes of heat are increaſed, they at the ſame time make many alterations in the body, inaſmuch as they produce a more violent attrition of the fluids againſt each other, againſt the veſſels, and of the veſſels againſt them; and as this increaſed attrition in the febrile heat ſuppoſes an increaſe of motion in the humours through the veſſels. But concerning this more may be ſeen in the comment to § 100, upon the ſame ſubject. In this place we only examine what may happen from a greater quantity of fire collected in the body: yet it will appear that the effects thence ariſing agree very much with thoſe which happen from an

an exceſs of the circulating motion, and which we enumerated among the effects of a fever, § 587.

The increaſed heat diſſipates the moſt fluid parts, &c.] When the blood of a healthy perſon is taken from a vein to prevent a plethora, in a cold ſeaſon it manifeſtly exhales a ſubtle vapour, which being condenſed againſt a looking-glaſs, or put into an alembic, appears in the form of drops adhering to the ſides. At the ſame time alſo blood lately taken from a vein affords a ſort of urinous ſmell, like unto that which exhales upon opening the abdomen of a living animal. By a chemical examination it appears that the lighteſt and moſt moveable part of the human blood is water, which aſcends from it with a very gentle heat; yet this is not pure water, but contains in it ſomething odorous, which ſeems to ariſe from the highly attenuated oil. But it has been a cuſtom to call the moſt ſubtle part of the blood by the name of ſpirit, becauſe it is the moſt moveable, and eſcapes the moſt penetrating eye. Yet is this different in every individual perſon; for hunting-dogs know how to diſtinguiſh their maſters by the perception of this effluvia, even though they ſhould be intermixed with a thouſand other people; and when they have once ſmelt the footſteps of the hare, they are able to follow her even to her form or ſeat; and this more eſpecially when there is a viſcid dew upon the ſurface of the earth to impriſon thoſe vapours, which are in their own nature ſo volatile, and by that means retain them longer, otherwiſe they ſoon vaniſh. The heat therefore being increaſed, it is evident that this more moveable part of the blood will be ſoon diſſipated. But alſo the ſalts and oils, though they are not reduced to ſo great a ſubtlety with the former, yet do they exhale from

from the body when the heat is much increaſed. Thus we ſee in the greateſt heats of the ſummer, that even people at reſt run down with ſweat; and which gathering upon the face, as it ſometimes happens, diſtils over the lips into the mouth, and manifeſtly affords a ſaltiſh taſte. But alſo the linen of ſweating people is ſpotted with a yellow fattiſh oil; and we ſee that in acute diſeaſes fat people loſe a great quantity of their fat, even though not ſo much as a ſingle drop of mere oil can be found in the excrements; but it is all ſo attenuated in the form of a ſoap with the ſalts rendered more acrid, as to be able to mix with water, ſo as to paſs out therewith from the body.

Dries, condenſes, and inſpiſſates the reſt into an impervious irreſolvable matter.] For the moſt watery, thin, and ſubtle parts of the blood are diſſipated, and therefore what remains being deprived of a great part of its watery diluent vehicle, by the interpoſition of which the other parts were prevented from uniting, will become drier, denſer, and more inclined to a morbid concretion. For this reaſon all things expelling the more moveable parts of the blood, are hereafter ranked among the cauſes of an atrabiliary cacochymy (§ 1093.) But alſo by an increaſed heat our blood and its ſerum may be diſpoſed to concretion without any great loſs of their more ſubtle parts. For the ſerum of the blood poured into ſcalding water is immediately congealed into a white opake maſs, ſomething like the white of an egg, even though it continues in the midſt of the water, the heat of which, though much leſs than boiling, we know will congeal; and when the heat of our body begins to exceed the hundredth degree of Fahrenheit's thermometer, there is then great danger of the blood's

blood's concretion, only from the increaſed heat [u], though at the ſame time this eaſy aptitude to concretion is a great deal increaſed by the diſſipation of the moſt fluid parts. But the blood, when once concreted in this manner by an increaſed heat, can either not at all, or very difficultly, be diſſolved again: for which reaſon inflammations ariſing from ſuch a coagulum of the blood are hardly ever to be cured by a reſolution; ſince this way of terminating an inflammation requires the obſtructing cauſe to be not over ſolid or compact (ſee § 386.) Hence therefore this concretion of the blood into an irreſolvable and impervious matter is juſtly ranked among the effects of an increaſed heat in fevers.

Sets at liberty the ſaline and oily parts, &c.] For we ſee that in the moſt inflammatory diſeaſes the fat of the body is ſo diſſolved and attenuated, that it ſoon paſſes out of the habit, although it is in its own nature ſo inactive or ſluggiſh. But that the ſalts are likewiſe attenuated and rendered more acrid when the body acquires a greater heat, appears from the alteration in the urine; for in a little time it becomes more red, ſaline, and almoſt alcaline or putrid in the hotteſt, inflammatory diſeaſes. Hence it is that a redneſs of the urine is eſteemed as a ſign of internal heat (as we obſerved before at § 673.) But how much great heat may conduce to cauſe putrefaction, by which the oily and ſaline parts of our blood are attenuated, moved, and rendered more acrid, has been ſaid before in the comment to § 84, N°. 5.

Hence it grinds away and breaks the ſmalleſt veſſels.] For ſince the increaſed heat ſuppoſes a more violent attrition of the ſolids and fluids, it is evident the veſſels muſt ſuffer a greater violence.

If

[u] H. Boerh. Chem. Tom. II. pag. 353.

If now at the ſame time the fluids begin to change their mild nature, and become acrimonious, there is the greateſt danger, leſt by increaſing the impetus with the denſity and acrimony of the fluids to be tranſmitted, the veſſels may be broke, more eſpecially the ſmalleſt of them, which are the leaſt able to reſiſt. For if we conſider that a matter is lodged in thoſe very tender ſmall veſſels in the pulpy cortex of the brain, which is rendered impervious by the increaſed heat, and behind which matter the impulſe of the vital fluid urges; or if we only conſider the fluids paſſing with a rapid motion through theſe veſſels, being rendered more acrid from the alteration of the ſaline and oily parts of the blood; ought we not therefore to conclude, that theſe very tender veſſels muſt be ſoon deſtroyed, ſince they are able to make ſo ſmall a reſiſtance, even in the ſtrongeſt perſon. Hence alſo the ill effects of an increaſed heat uſually appear firſt by injuring the functions of the encephalon or lungs, becauſe in theſe parts the veſſels are the ſmalleſt and tendereſt, and the blood is carried with a moſt rapid motion through the lungs.

Dries the fibres, and renders them rigid and contracted.] For ſince heat diſſipates the moſt fluid parts, the quantity of that fluid will be leſſened, which ought by the laws of nature to flow through the very ſmalleſt veſſels. And ſince the reſt of the maſs deprived of its moſt thin and fluid parts begins to heſitate in the ultimate extremities of the larger arteries, this will produce an obſtruction of thoſe veſſels; and therefore the ſmaller arteries, which ought to receive their thin fluid from thoſe arteries, will be empty (ſee the comment to § 120); and the ſides of thoſe ſmall veſſels being no longer diſtended by a fluid, will collapſe and grow together; and from hence ſo often remain incura-

ble diſeaſes, which continue as long as life itſelf, after the perſon has ſuffered acute diſeaſes. But all this will be farther increaſed, when the larger veſſels obſtructed and diſtended compreſs the adjacent ſmaller ones. For we ſee very evidently this ſad effect of the increaſed heat in ardent fevers, when the whole ſkin of the body appears dry and juiceleſs, the tongue becomes perfectly rigid and contracted with drought, the fauces are parched up, and the eyes appear dry and duſty for want of that lymph which ought to moiſten and cleanſe them. Hence Hippocrates juſtly pronounces that all thoſe periſh with drought, who die of ardent fevers, ſee the comment to § 100.

Hence of a ſudden it produces many ſwift, *&c.*] If now we conſider all the effects of heat, the reaſon will evidently appear why it may produce a great many and ſuddenly fatal diſeaſes. For the integrity of all the vital, natural, and animal functions depends on a free motion of the humours through the veſſels. But by an increaſed heat thoſe motions are diſturbed or entirely aboliſhed; whether this happens either from a rupture of the ſmaller veſſels, or from the larger veſſels diſtended with impervious matter, and compreſſing the ſmaller, *&c.* When therefore theſe injuries happen from too great a heat in thoſe parts of the body upon which life more immediately depends, ſpeedy death enſues; and this moſt ſuddenly of all, if the ſerum of the blood begins to coagulate by the immenſe increaſe of the heat: for in a little time it will heſitate impervious in the ſmalleſt veſſels of the lungs, and intercept all the paſſage of the blood from the right to the left ventricle of the heart through the lungs, whence a moſt acute and fatal peripneumony will attend. The ſame thing will happen if the fabric of the cerebellum is either

either deſtroyed, or ſo ſtuffed up with impervious humours as to hinder the influx of the vital ſpirits through the nerves from the cerebellum to the heart. It is therefore evident with how much care one ought to attend to this febrile ſymptom, in order to prevent theſe fatal events, by artificially leſſening the too great heat. But by what remedies the febrile heat may be mitigated, we are now to declare.

SECT. DCXC.

FROM what has been ſaid we may at length be able to underſtand well what is required to mitigate the heat, and what various remedies conduce to the ſame purpoſe.

Since from what has been ſaid it appears what are the cauſes of increaſed heat in fevers, and how various they may be, it is evident that in the cure ſerving to mitigate this heat, one ought carefully to diſtinguiſh from what cauſe it ariſes, and whether it ought to be aſcribed only to one, or ſeveral of thoſe cauſes acting together: for thus we ſhall have an indication which will direct us what is to be done, and pointing out at the ſame time what remedies are convenient to anſwer the intention. The cure therefore of each of the cauſes increaſing heat ought to be delivered by itſelf: and when this is done, it will be evident what courſe muſt be taken when the increaſed heat proceeds from ſeveral of theſe cauſes acting conjunctly.

SECT. DCXCI.

F the velocity only occaſions the increaſed heat, the remedy will be every thing that ſſens it: ſuch as reſt of the muſcles and of ie mind, blood-letting, a gentle and ſhort ompreſſure of the veins in the limbs: the apication of things moderately cool, both interally and externally, together with diacodiate edicines prudently uſed, are the chief.

When therefore too great a quickneſs of the moon of the fluids through the veſſels offends, every ing will be convenient that is capable of leſſening at motion. But this velocity proceeds from two uſes; namely, the action of the heart impelling y its muſcular force the blood into the arteries; nd then the contraction of the arteries diſtended y the blood drove into them by the heart, and by hich the blood moves forward at the time when e heart is dilating. Theſe cauſes ought therefore be leſſened, in order to diminiſh the velocity. ut if the action of the heart is weakened, the rection of the arteries contracting themſelves upon e blood will be likewiſe leſſened; for the arteries act more powerfully as they are more diſtended dilated: therefore ſuch things are required as minish the frequency and force of the heart's ontraction, as we demonſtrated before at § 102, hen we treated of the cure of diſeaſes ariſing on from an exceſs of the circulatory motion. But appeared from what was ſaid at § 574, that the uicker contraction of the heart proceeds from a uicker reciprocal influx of the nervous fluid into e muſcular fibres of the heart, and of the blood

into its veſſels and cavities; and it there appeared that the moſt powerful among theſe cauſes was that which ſuppoſes an increaſed quantity and impetus of the venal blood conveyed into the cavities of the heart; ſince by that only the motion of the heart might be renewed even after death, when the other cauſes ceaſe to act; and in a living perſon the motion of the venal blood being accelerated towards the heart, for example, by frictions, the velocity of the circulation, and the heat thence produced may be almoſt increaſed to any degree. And therefore the reaſon is evident why to diminiſh the velocity of the blood alſo requires

Reſt of the muſcles and of the mind.] For the muſcles, when they move, ſwell, and compreſs the adjacent veins; and by that means they accelerate the motion of the venal blood towards the heart. Moreover, the muſcles, when they act, look pale, by expreſſing all their contained blood, which will therefore return ſwifter through the veins to the heart. This is the reaſon why the motion of the humours through the veſſels is ſo much accelerated by violent exerciſes of body. But how great an influence paſſions of the mind have towards increaſing this velocity was ſaid before in the comment to § 99, and in the commentaries to § 104, & 605, N°. 5. we treated of the remedies which are found to be the moſt effectual in quieting commotions of the mind. Therefore the ancient phyſicians have ordered that patients afflicted with acute diſeaſes, ſhould lie in a dark ſtill place, remote from all noiſe, that thus all things may be avoided, which are capable of violently affecting either the internal or external ſenſes.

Blood-letting.] For we are able at pleaſure to diminiſh the increaſed velocity even to fainting by this means; and then all the humours begin to reſt,

reſt, and in a little time a coldneſs enſues. For where there is ſo great an increaſe of heat perceived in a febrile patient, that there is danger of the more tender veſſels being deſtroyed in a ſhort time, or of the blood and its ſerum beginning to be coagulated into a maſs irreſolvable for the future, we cannot then truſt thoſe remedies which ſlowly and gradually diminiſh the heat, becauſe there is the greateſt danger in delaying: and therefore in ſuch a caſe blood-letting is to be immediately performed, and the evacuation made ſufficiently large; and the ſame is to be repeated again if the heat increaſes too much. For thus the maſs of the liquids to be moved is diminiſhed, as the moſt denſe part of our fluids, which is moſt diſpoſed to generate and retain heat, namely, the red blood, is evacuated from the body. Room is alſo made for diluent liquors, which thus mix more eaſily with the remaining blood, now become too much inſpiſſated from the too great heat. See alſo what has been ſaid of blood-letting in the comment to § 610. where we treated of allaying the too great force of the fever.

A gentle and ſhort compreſſion of the veins in the limbs.] For by this means the venal blood is prevented from flowing ſo violently and plentifully into the heart, ſo as to irritate it into more violent contractions. But this compreſſion by bandages or ligatures ought only to be gentle, ſo as to leſſen the diameter of the larger venal trunks ſeated towards the ſkin, but not ſo as entirely to compreſs them; becauſe then likewiſe the arteries, which empty themſelves into thoſe veins, would not be able to ſend forward their blood; whence the number of the pervious veſſels would be diminiſhed, and conſequently the heat would be increaſed (ſee § 682.) and therefore in ſuch a

caſe the diminution of the heat ariſing from a retention of the blood, by a ſtricture upon the veins, would be of little ſervice. But when there is only a moderate compreſſure of this kind made upon the veins of the limbs, they dilate and ſwell more below the ſtricture; and even the whole limb, if this compreſſure continues a long time, will be increaſed in bulk from the liquid here accumulated. But how much uſe a gentle compreſſure of the limbs is of to abate the velocity of the blood moving through the veſſels, we are taught from hæmorrhages, which are uſually well ſuppreſſed by the uſe of ſuch ligatures; when by this means there is a ſufficient quantity of blood retained in the limbs, and a leſs preſſure of it made againſt the divided veſſels, which then uſually contract and cloſe; and afterwards, when theſe ligatures are gradually looſened, the blood does not ſo eaſily eſcape through the contracted mouths of the open veſſels. But it is moſt adviſeable to apply ſuch ligatures alternately, at one time to the thighs, and at another time to the arms, removing them every half hour, rather than let them continue too long upon the ſame parts, for fear of ſuffocating the vital motion: For although the bandages were but ſlightly applied at the beginning, yet when the ſubjacent parts begin to ſwell, the ligatures will be too ſtrict, ſo as not only to leſſen the capacity of the veins, but entirely compreſs them together with the arteries; whence a ſudden gangrene might frequently happen. Nor is it any objection to this, that in the comment to § 105, we recommended a relaxation of the veins to diminiſh the velocity of the blood's motion; for this has the ſame effect, inaſmuch as it renders the relaxed veins more eaſily dilatable, ſo that they may contain a greater quantity of blood: But this ſame effect may be obtained by a gentle

gentle compreſſure of the veins. The principal uſe of ſuch a compreſſure of the veins is to mitigate the febrile heat, when it returns again too violently after repeated bleeding; and when there has been ſo great a quantity of blood taken from the body, that the ſame evacuation cannot be repeated again without danger.

The application of things which moderately cool and quiet the blood both internally and externally.] It appears from experiments, that bodies which contain a greater quantity of fire than the ambient medium, or adjacent bodies, loſe that heat, when other bodies leſs hot are applied to them; and this more eſpecially if they are immerged into colder fluids, and the immerſion often repeated: and therefore it ſeems, that the application of cold things, as well internally as externally, will be of uſe, when the body burns with too great a febrile heat. But it will readily appear, that the greateſt caution is neceſſary in the application of theſe; for the denſity of the blood and conſtriction of the veſſels are often increaſed by the indiſcreet application of cold things, and therefore the cauſes producing heat are from thence alſo increaſed: as thoſe experience who handle ſnow, whence afterwards there follows a great heat in the parts which were before very cold. But ſince the febrile heat is accompanied with a violent inflammatory tenacity of the blood, or at leaſt is ſoon after followed with ſuch a tenacity from the diſſipation of its more fluid parts, and an inſpiſſation of what remains; therefore there is the greateſt danger, leſt by a ſudden cooling, the veſſels ſhould be contracted, and the blood condenſed, ſo as to produce the worſt conſequences. See what has been ſaid in the comment to § 640, N°. 1. concerning cold drink to allay thirſt in fevers, where we treated

more at large alſo upon this ſubject. It is therefore better firſt to apply things that are not much leſs hot than the healthy body, and to deſcend gradually to things colder, rather than all at once to give drinks extremely cold, or make ſuch applications externally, while the body is extremely hot; which can hardly ever be done without danger, more eſpecially if the fever is accompanied with an inflammation. Add to this, that warm water may introduce a conſiderable coolneſs thro' the body by relaxing the veſſels, by diluting the blood, and removing its too great denſity, and conſequently it will diminiſh the cauſes of the febrile heat. Yet a prudent uſe of a cool air ſurrounding the patient may be of the greateſt ſervice: and this will more eſpecially ſucceed if the patient is not over-loaded with bed-cloaths, but either ſits up in a chair, if his ſtrength will permit, or elſe lies down upon a bed with his body lightly covered; in the mean time the windows being opened, the air of the patient's chamber wherein he lies may be renewed ſeveral times in a day; or if the external air is too hot in the ſummer-time, an agreeable coolneſs may be communicated to it, according to the method before recommended at § 605. Hitherto more eſpecially will conduce the filling of the air with exhalations of cold water ſprinkled about the chamber; that thus the air containing a greater quantity of water may not ſo eaſily grow warm, by the hot atmoſphere with which the human body is encompaſſed; and hence *(cæteris paribus)* healthy people likewiſe perceive themſelves cooler in a moiſt air than in a dry one. At the ſame time alſo the moiſture of the air is uſeful, inaſmuch as it corrects the dryneſs of the body, which is an effect of the too great heat. Hence Galen [w] orders an agreeable coolneſs to be

[w] Method. Med. Lib. X. cap. 8. Charter. Tom. X. p. 234.

be communicated to the air, by pouring water out of one veſſel into another, by ſprinkling cold water about the houſe, and laſtly, by ſtrewing roſes, vine-twigs, or tops of brambles, &c. about the floor, and at the ſame time to be careful not to make the houſe too warm, nor let the patient be diſturbed by too many viſitors.

Diacodiate medicines prudently uſed.] When all theſe means are tried, and the too great velocity of the blood ſtill continues, nothing is more ſerviceable than to allay this too great impetus by diacodiate medicines, as Sydenham frequently obſerves to us. Indeed, in the beginning of acute diſeaſes he tells us the uſe of theſe is leſs ſafe, but if they are given in the declenſion of the diſeaſe, after evacuations have been uſed, he aſſures us they always prove of great ſervice[x]. But he more eſpecially experienced the uſe of theſe in the cure of the confluent ſmall-pox, and principally in that moſt dangerous ſtage of this diſeaſe, wherein the whole ſurface of the body is covered with matter, or often a gangrenous ichor, which, being returned into the blood, excites an intenſe fever, which often kills the patient ſuddenly, unleſs the increaſed velocity is allayed by prudent uſe of diacodium or liquid laudanum; he would therefore have ſuch a medicine given every eight hours in this caſe, and to keep it by the patient in readineſs to be immediately given, upon any ſudden occaſion in this doubtful ſtage of the diſeaſe: and he aſſures us that he is firmly perſuaded ſome that he knew periſhed of this diſeaſe, only becauſe they were deſtitute of this remedy[y]. But the doſe ought to be gradually and prudently increaſed, beginning only with the moſt gentle paregorics, till their effects anſwer the phyſicians expectations.

[x] Sydenham. Sect. I. cap. 4. pag. 82. [y] Ibid. Diſſertat. Epiſtol. pag. 468.

But what we ſaid before concerning moderating the febrile impetus, ſo that it may be neither too violent nor too ſluggiſh (§ 609.) ought alſo to be particularly obſerved here in allaying the febrile heat, ſince the various intenſity of the febrile heat is uſually accompanied with different degrees of impetus, as we obſerved before in the place cited; and therefore the too great heat is not to be leſſened ſo far as to make the patient cooler than he uſed to be in health; but rather a greater heat is to be left, provided it be not ſo immoderate as to give us reaſon to apprehend too great a diſſipation of the fluids, or a deſtruction of the very tender veſſels. The reaſons for this practice were given before in the comment to § 609.

SECT. DCXCII.

IF the cauſe of the febrile heat is from too great a denſity of the blood, § 678, it is cured by ſuch things as diminiſh its velocity, § 691, as alſo by the drinking of water and oxymel, with ſuch things as relax the veſſels.

The denſity of the blood (as we obſerved before at § 678.) proceeds from the action of the veſſels upon the fluids, and of the fluids againſt them: ſince therefore the velocity of the humours thro' the veſſels being increaſed, the cauſes condenſing the blood act more powerfully and frequently in a given time, it is evident that this velocity muſt be leſſened, in order to remove the preſent, and prevent a future too great denſity of the blood. Add to this that by the increaſed velocity there is always a loſs of the moſt fluid parts, and conſequently

quently an inſpiſſation of what remains. To this end therefore will conduce every thing recommended in the preceding aphoriſm. But ſince the moſt fluid and moveable part of our blood conſiſts almoſt entirely of water, it will be one of the beſt remedies to reſtore that which has been once loſt from the blood by a plentiful drinking of watery liquors. But becauſe the particles of the blood cohering together from a loſs of its moſt thin juices, by the interpoſition of which the concretion of theſe parts was prevented, cannot be again eaſily divided by intermixing water only, more eſpecially if the blood is already impervious and heſitating in the extremities of the veſſels; therefore to water are added ſuch things, as by a ſaponaceous diſſolving power may remove theſe concretions, and at the ſame time powerfully reſiſt all putrefaction, which is always much to be feared, when there is too great a heat. Hence oxymel appears to have been ſo much in uſe, and is ſo highly recommended among the antient phyſicians in the cure of acute diſeaſes; and in the ſame manner likewiſe the juices of elder-berries, currants, mulberries, inſpiſſated or prepared with ſugar, are very ſerviceable if made into a drink with water, concerning which ſee what has been ſaid of the cure of inflammation, § 398, where we treated of thoſe remedies by which the obſtructing matter might be rendered fluid. For here ſuch remedies are required as are able to diſſolve and attenuate the too thick blood without increaſing the velocity, while at the ſame time they reſiſt putrefaction; therefore not all diſſolvents are here convenient, and the alcaline ſalts both fixed and volatile, together with the ſoaps prepared from them, are not made uſe of in this caſe, becauſe they offend by their ſtimulus, and incline the humours to an alcaline nature.

But

But ſuch things as relax the veſſels greatly cool; as the veſſels being relaxed act leſs upon their contained humours, and yield more eaſily to the impulſe of them: and hence there is leſs danger of obſtructions for the future, while thoſe already formed are reſolving, and while the relaxed veſſels more eaſily tranſmit what is already heſitating in their narrow extremities; therefore at the ſame time ſuch things as relax diminiſh the reſiſtance ariſing from the narrowneſs or immobility of the veſſels, which we ranked among the cauſes of heat (§ 680.) The drinking of warm water, warm bathing, fomenting, and the application of vapours, make the chief remedies for relaxing, more eſpecially if they were boiled with farinaceous and emollient ingredients. Hence the decoction of barley with oats or oxymel, emulſions of the mealy ſeeds, decoctions of mallows, marſh-mallows, and the like, ſatisfy all theſe intentions: for they dilute by their water, attenuate and reſiſt putrefaction by the oxymel which is added, and at the ſame time relax the veſſels by their ſoft glutinous ſubſtance plentifully diluted in water.

SECT.

SECT. DCXCIII.

THE too great maſs to be moved in a mere plethora is eaſily leſſened (§ 106. N°. 6.) but in a cacochymy it is to be removed ſlowly, by repeating evacuations at intervals, and by correcting the humours at the ſame time; but when the fat is diſſolved and put into motion, which before ſtagnated, there is the greateſt difficulty in leſſening the offenſive maſs: then watery drinks with acids, honey, the yolks of eggs, and ſugar, are of the greateſt uſe, together with evacuating remedies conſtantly uſed.

When there is too great a quantity of good blood in plethoric people, that may be eaſily removed by blood-letting, which may thus directly evacuate what offended by its too great quantity, and this too at pleaſure, according as there may be occaſion. But if a redundant cacochymy increaſes the maſs to be moved, we are not able to remove that altogether and at once, as in a plethora; becauſe by making a large evacuation of blood in this caſe, the humours degenerating from their healthy ſtate ſtill are left behind in the veſſels, while the good part of the blood is equally diminiſhed by the diſcharge, though the quantity of that is always deficient in a cacochymy, notwithſtanding there is too great a maſs of humours to be moved. For when in a pale girl the whole body is turgid with mucous and unactive humours, there is often but a very ſmall quantity of good red blood in them; and therefore by large or repeated bleedings an inſuperable weakneſs may be brought on afterwards. But when the ſtagnant hu-

mours which occaſioned that white tumour of the body are put into motion by a fever, the maſs to be moved too much increaſes, ſo that from thence one may fear a rupture of the weak veſſels; indeed part of the diſtending liquid ought to be removed here but ſlowly, and by repeated evacuations, uſing blood-letting with moderation; or by the uſe of ſuch purges as do not increaſe the motion, nor much diſſolve the healthy humours, but evacuate thoſe which oppreſs the body by their too great quantity; for in this caſe, though there is a greater quantity of juices in the body, yet there is not ſo great a heat raiſed thereby, becauſe the red part of the blood is abſent, which is moſt apt to generate heat, and preſerve it a long time when produced, as we demonſtrated before. But the greateſt difficulty of all is, if the cacochymy be joined with a great acrimony, as in a very bad ſcurvy, or atrabilis diſſolved and put in motion, *&c.* for there is the greateſt danger leſt the veſſels diſtended by acrid humours put into motion by the fever, ſhould be broke through by them; and as the whole maſs of humours is infected with the ſame acrimony, how much ſoever you leſſen the maſs by evacuating, yet the ſame malignity continues in what remains, and may there be able by its acrid ſtimulus to continually increaſe the circulation; and hence the moſt acute fevers are often excited, as we ſhall hereafter declare in the hiſtory of the ſcurvy and atrabiliary melancholy. In that caſe therefore it is principally neceſſary to correct by oppoſite remedies, as much as poſſible, the known acrimony of the prevailing cacochymy, as it appears by its proper ſigns, and then by a prudent evacuation to ſubſtract the redundant quantity.

But the maſs of juices is never more ſuddenly, or more dangerouſly increaſed, than when the fat

being diſſolved by an acute fever in corpulent men is attenuated by the increaſed heat, and mixed with blood. For it appears from the moſt certain obſervations, that a fat perſon may in a few days time be rendered perfectly lean by an acute fever; and even as we mentioned before upon another occaſion, in the comment to § 587. that a fever raiſed by bitters and warm medicines often happily removes too great fatneſs. But this great quantity of fat, after being diſſolved, enters the veins, and mixes with the blood; and therefore we cannot, even by the moſt profuſe bleeding, evacuate ſo much of this fat as is daily diſſolved, and mixed with the circulating humours. Hence all the effects of an extreme plethora are renewed every day; and theſe diſorders are increaſed, becauſe in fat people the blood-veſſels are often very narrow, and therefore leſs capable of bearing a ſudden increaſe of their contained maſs. For fat animals, as Ariſtotle [z] long ago obſerved, have leſs blood. Moreover, when the blood is charged with ſo great a quantity of diſſolved fat, the worſt inflammations are to be feared; becauſe this oil paſſes more difficultly through the ſmalleſt veſſels, and hinders the paſſage of the other humours; for thus we ſee an erysipelas is raiſed in many people by the application of fat ſubſtances externally to the ſkin. If now we alſo conſider that this oil inclines to a rancid and very bad acrimony, from the rapid febrile motion and increaſed heat, it will readily appear what diſorders are juſtly to be feared in ſuch a caſe. Here therefore we may apply the admonition of Hippocrates [a], when he ſays, *Natura admodum craſſos celerius interire, quam graciles.* "That thoſe who "are very corpulent die ſooner than thoſe who are "lean." The curative indication in this caſe therefore

[z] Hiſt. Anim. Lib. III. cap. 19. Tom. II. pag. 257.
[a] Aphor. 44. Sect. II. Charter. Tom. IX, pag. 83.

therefore is to remove the fat as much and as ſoon as poſſible. But we obſerved in ſuch a caſe that the urine is very red, frothy and ſaponaceous, and the ſweats often ſmell very ſtrong, and are almoſt greaſy: Here therefore it will be convenient to uſe plentiful drinking of watery liquors to afford a vehicle for the urine and ſweat; but ſince by urine only ſuch a quantity of the oil can be evacuated, as can be intimately mixed with the acrid ſalts of the blood, ſo as to unite with the urine, and be thus as it were reduced into a kind of ſoap ſoluble in water; therefore it will be convenient to give with watery liquors ſuch things as are capable of rendering oil and water miſcible together. It is well known that ſugar and honey have this power, as they are a kind of native ſoaps, and being ground a long time with oils render them capable of being diſſolved in water. The yolks of eggs have alſo the ſame power, as we know from the daily uſes to which they are applied in the ſhops, where ſperma ceti, turpentine, and the other native balſams, and expreſſed oils being ground with the yolks of eggs are afterwards diſſolved in draughts, or aqueous drinks: But ſince by heat in fevers there is danger of putrefaction ſupervening, we therefore uſe yolks of eggs more ſparingly, becauſe they are very eaſily changed into the very worſt kind of putrefaction; or if they are uſed, plenty of acids are likewiſe added to correct their inclination to putrify. But for ſugar or honey, or the medicines prepared of theſe to produce the deſired effects, they ought to be given in a great quantity; nor will it do any harm to give them, even to the quantity of a pound or upwards, within the ſpace of a day or night, if they are plentifully diluted with water and the addition of acids; and then likewiſe they uſually looſen the bowels, which is of

the greateſt ſervice in this caſe. Hence the ſyrrups of violets, the juice of citrons, of elder-berries, currants, ſimple oxymel, and the like, are of the greateſt uſe here, when the fat, diſſolved by an acute fever, occaſions this oily plethora. But as this too great fulneſs ought to be diminiſhed, evacuations are required at the ſame time, either by bleeding repeated according to the circumſtances, when the blood-veſſels are thus much diſtended, not without danger of a rupture; or by a flux of the bowels which may diſcharge a great quantity of this load, without ſo great a loſs of the good blood, as would happen by repeated and profuſe bleeding. For this purpoſe therefore ſuch medicines are chiefly recommended, which by a gentle ſtimulus ſollicit the humours towards theſe parts, and in the mean time do not increaſe the velocity of the circulation, nor much diſturb the body; ſuch as cream and cryſtals of tartar, ſal-polychreſt, nitre, tamarinds, manna, and rhubarb, *&c.* which if given at the ſame time when the oil is rendered miſcible with water by the previous uſe of honey and ſugar, as directed, they often evacuate almoſt an incredible quantity of moſt ill-ſmelling matter from the bowels, to the great relief of the patient: and in the uſe of theſe ought one to perſiſt until the heat is leſſened, and the ſenſible depletion of the veſſels, before too much diſtended, denotes that the maſs to be moved is ſufficiently leſſened. Whey made of ſkimmed milk, being deſtitute almoſt entirely of oil, drank in great quantities is very uſeful; and by this alone life may be ſupported in ſuch diſeaſes without giving any other food.

SECT.

SECT. DCXCIV.

AN obſtruction of the veſſels cauſing heat (§ 682.) may be underſtood from the cure of obſtruction (§ 125 to 144.), and from the cure of thoſe ſymptoms or diſorders which ſupervene in wounds from a loſs of the veſſels (§ 145 to 331.).

Since every obſtruction ſuppoſes a hindrance to the paſſage of the fluid to be tranſmitted through a veſſel (ſee § 107.), therefore an obſtruction being formed will increaſe the reſiſtance to the blood expelled from the heart through the veſſels; and therefore in this reſpect obſtruction may be ranked among the cauſes of febrile heat. But concerning the cure of obſtruction, ſo far as it depends either on the fault of the tranſmitting veſſels, of the fluid to be tranſmitted, or of both together, we have already treated at large in the aphoriſms here cited in the text, under the title of obſtruction, from whence may be derived what is neceſſary to be known in this place.

But when by wounds, and eſpecially after amputations of larger limbs, a great number of the veſſels are deſtroyed, it is out of the power of art to ſupply that defect: and nothing more then remains than to leſſen the quantity of the fluid to be tranſmitted, that thus the reſiſtance may be diminiſhed, and the too great fulneſs of the other veſſels removed; concerning which ſee what has been ſaid before at § 474.

SECT.

SECT. DCXCV.

IF the heat proceeds from a narrowneſs of the veſſels (§ 683) a dilatation of them is required by relaxing remedies (§ 54.)

The capacity of the veſſels, as we ſaid before in the comment to § 683, depends on two cauſes which mutually oppoſe each other; namely, the impulſe of the fluid by which the ſides of the arteries are removed from their axes, and the reſiſtance of their ſides oppoſing the impulſe of the liquid. The too narrow veſſels may be therefore dilated by increaſing the force of the impelled fluid, or by leſſening the reſiſtance of their ſides, or by procuring both of them together. But if the impulſe of the liquid is increaſed, the heat will likewiſe increaſe, as we demonſtrated before: and therefore nothing remains in this caſe, but to leſſen the reſiſtance of the ſides; for then the impulſe of the fluid remaining the ſame, the ſides of the veſſels more eaſily yield, and their cavity will be dilated. This will be beſt of all obtained by relaxing and emollient remedies, and eſpecially by a vaporous bath, by which we know that the moſt ſolid and hard parts of animals are ſo much ſoftened in a ſhort time, that they almoſt diſſolve into a fluid. At the ſame time alſo too great dryneſs by this method, which uſually accompanies a narrowneſs of the veſſels, may be corrected, (ſee § 683) while in the mean time the mouths of the inhaling veins being relaxed, the watery warm vapours eaſily inſinuate themſelves.

SECT. DCXCVI.

BY which ſame means alſo is removed too great heat of the veſſels ariſing from rigidity (§ 54.)

See what has been ſaid concerning the cure of too great rigidity in the veſſels and viſcera in the comment to § 54.

SECT. DCXCVII.

BUT whenever the exceſs of heat ariſes from theſe two cauſes conjunctly, then the remedies hitherto deſcribed (§ 690, to 697) will be moſt effectual, combined together.

Hitherto we have conſidered the cure of febrile heat ſo far as it is produced from ſingle cauſes; but now ſeveral of theſe cauſes may concur together at the ſame time (as we have already ſeen before at § 686, 687;) and therefore in the like caſe ſuch remedies are required as are known to be proper for ſubduing the diſcovered cauſes of the heat. Nor yet does the curative indication ariſe very intricate from hence, although ſeveral of the cauſes of febrile heat ſhould be combined together; and it is eaſy to underſtand all theſe from what has been already ſaid. For frequently one and the ſame method of cure ſerves to ſubdue ſeveral cauſes of the febrile heat at the ſame time. Thus for example, blood-letting is uſeful when the velocity of the blood is increaſed, and likewiſe it leſſens the too

too great denſity of it, and quantity of the maſs to be moved, and in the cure of obſtructions it is often of the greateſt uſe, &c. The too great denſity of the blood with a narrowneſs and rigidity of the veſſels require ſuch remedies as relax, &c. and therefore it will not be difficult to diſcover from what has been ſaid the proper methods to be taken for the cure of febrile heat, proceeding from combined cauſes.

SECT. DCXCVIII.

FROM all this doctrine of heat (§ 673, to 698) we may be able to underſtand why the hotteſt fever is alſo acute, putrid, and of ſhort duration; and even peſtiferous in the moſt intenſe heats? why the heat of the bed, confined air, diet, and medicines, are ſo very injurious in theſe febrile heats? why a burning heat about the heart and hypochondria is ſo bad? Heat indeed putrefies; but putrefaction of itſelf does not cauſe heat in fevers.

But from what has been ſaid concerning febrile heat, we may be able to underſtand many particulars in diſeaſes, of which ſeveral are enumerated in the preſent aphoriſm.

Why the hotteſt fever is acute and of ſhort continuance, &c.] A fever which runs through its courſe ſwiftly and with danger is termed acute. (See § 564.) But in every fever where there is a great heat there is great danger, becauſe by the increaſed heat the moſt fluid parts of the humours are diſſipated, and the blood with its ſerum is inclined to a concretion hardly reſolvable; and at the

ſame time there is great reaſon to fear, leſt the violent attrition of the fluids againſt the veſſels, which always attends an increaſed heat, ſhould deſtroy the moſt tender canals, whence ſudden death uſually enſues: and therefore ſince the hotteſt fever is of neceſſity attended with danger and celerity, it is always deſervedly termed acute. But ſince it was demonſtrated in the comment to § 689, that an increaſed heat ſets at liberty the ſalts and oils of our humours, attenuates them, renders them more acrid, diſſipates, and puts them in motion; the reaſon is therefore evident why the hotteſt fever is alſo putrid: namely, when the forementioned ſalts and oils of the blood are thus changed, then our humours begin to incline to putrefaction. Hence alſo in the hotteſt fevers we obſerve a ſtinking breath, a diſcharge of corrupt bile, often changed into a moſt ill-ſmelling liquid in a flux of the bowels, an evacuation of fœtid, ſcalding, or acrid urine cauſing the ſtrangury, ſtinking ſweats, &c. But where there is the greateſt heat, in conſequence of which all thoſe bad ſymptoms ſuddenly follow, the patient cannot long ſurvive: and in that caſe the fever is termed peſtiferous, becauſe it kills the patient in the very firſt attack of the diſeaſe. Hence it is evident with how much care we ought immediately to have recourſe to the moſt efficacious remedies, when the febrile heat is very great; becauſe frequently, in a few hours time, the tendereſt veſſels are ſo far deſtroyed, that the very beſt medicines will be uſed to no purpoſe; or elſe the humours are ſo coagulated by the heat, that they cannot paſs through the narrow extremities of the arteries.

Why the heat of the bed, confined air, &c.] The human body is always hotter than the ambient air in which we live, and therefore the heat

of

of our body is diminiſhed, when the air has free acceſs to it. If now a patient burning with too great heat is confined to his bed, and ſo covered with bed-cloaths, as to exclude the air on all ſides, in that caſe the whole body will be retained in a hot atmoſphere of vapours, exhaling from the patient's own ſkin, and conſequently the heat will be increaſed, becauſe the cool air is prevented from taking off the heat. Moreover, in the hotteſt diſeaſes, that which exhales from the patient's body is often ſo malignant, that it diſorders the byſtanders: what then muſt it do to the patient, who continues day and night immerſed, as it were, in theſe putrid exhalations confined to his bed, and ſmothered up with cloaths; and frequently great care is alſo taken to prevent any new or freſh air from entering into the apartment where the patient lies? But the incomparable philoſopher Dr. *Stephen Hales* [b] has demonſtrated, that the air is conſumed, and its elaſticity leſſened, when it has been inſpired by animals; and therefore it is evident how badly the welfare of the patient is conſulted, when he is deprived of this neceſſary renovation of the air, and the agreeable coolneſs which it naturally communicates to the body. This perverſe method was more eſpecially encouraged, becauſe there were phyſicians formerly of opinion, that the febrile matter might be the moſt ſafely evacuated from the body by ſweats; for which reaſon they always inſiſted upon having the whole ſurface of the body covered up in the warm bed. But as Sydenham has very well demonſtrated, in the end of the diſeaſe, the ſubdued and concocted morbific matter is ſometimes thus expelled; but in the beginning of diſeaſes the induſtrious raiſing of ſweats by art carries off the moſt fluid

[b] Vegetable ſtaticks, pag. 232, et ſeq.

parts of the blood, and always renders the diſorder more malignant. For this reaſon the great Sydenham [c] generouſly oppoſed himſelf to the torrent of ſo bad a practice, and at that time alſo without the aſſiſtance of any other; and he aſſures us that he was not able to moderate the too great violence of the fever by bleeding, and the other aſſiſtances of art, if the patient was confined to his bed, and thus loaded with cloaths. He therefore ordered that the patient ſhould ſit up in a chair for a few hours every day, or if the weakneſs was ſo great as to prevent this, to lie at leaſt ſlightly covered upon the bed. This heating method is alſo wiſely condemned by the ancients. For thus Celſus [d], ſpeaking of the cure of an ardent fever, ſays: *Etiam amplo conclavi tenendus, quo multum & purum aërem trahere poſſit; neque multis veſtimentis ſtrangulandus, ſed admodum levibus tantum velandus eſt.* "That the patient ought to be kept in a large "chamber, where he may breathe much pure air; "nor ſhould he be ſmothered with many bed-"cloaths, but only be covered over with ſuch as "are very light." At the ſame time it is alſo very evident how pernicious it muſt be to increaſe the heat (which is already too great) by a full diet, eſpecially of fleſh-meats, and by ſtimulating medicines ſo often recommended under the title of cordials. The antient phyſicians gave only the moſt thin and cooling diet in all acute diſeaſes, with medicines of the like kind. See what has been ſaid upon this ſubject in the comment to § 610, and 611, where we treated of increaſing and quieting the force of a fever.

Why a burning heat about the heart and hypochondria is ſo bad?] The very ingenious Dr. Martine

[c] In Diſſertatione Epiſtolari, pag. 454. & aliis pluribus locis.
[d] Lib. III. cap. 7. pag. 134.

tine [e] has demonstrated by the most just reasoning, from measuring the proportion of the diameters of the arteries with respect to the trunks from whence they arise, and by direct experiments [f] confirms, *Calorem in variis partibus animalis sani, ab aëre externo non frigentibus, ullove modo mutatis, esse fere æqualem.* "That the heat in various parts of the "healthy animal body, not being cooled by the "external air, or any other way altered, is nearly "uniform or equal." Even in the heart itself of a living animal, which the antients made the fountain of natural heat, there is no greater heat perceivable than in the other parts [g]. The heat of the body is therefore so uniform in health, that every part is cherished almost with the same degree of heat, and therefore Hippocrates [h] justly esteems it one of the best signs in diseases when the whole body is equally warm and soft: for then we know that the pervious fluids are freely moved through the open vessels. But in those parts, where there arises a greater resistance to the fluids propelled through the vessels, whether this happens either from a fault of the fluid to be transmitted, or of the transmitting vessels, or from both, the attrition, and consequently the heat, will be increased, as we demonstrated a little before. It is therefore with the greatest reason that Hippocrates [i] makes the increased heat in any part of the body a sign, that the disease there fixes its seat, when he says: *Et qua parte corporis inest calor, aut frigus, ibi morbus insidet.* "In that part of the body where there is "heat or cold, therein is the disease seated." But

[e] Medical Essays, Tom. III. pag. 150.
[f] De similibus animalibus & animalium calore, pag. 168.
[g] H. Boerh. Instit. Med. § 169.
[h] In Prognost. Charter. Tom. VIII. pag. 622. Et in Coac. N°. 492. ibid. pag. 880.
[i] Aphor. 39. Sect. IV. Charter. Tom. IX. pag. 161.

cold in the affected part denotes a diminished attrition, and consequently a deficiency of the vital circulation; but heat on the contrary denotes an increased resistance in some of the vessels, and generally a greater velocity of the fluids through the adjacent pervious vessels; therefore in both these cases the part affected deviates from the laws of health. When therefore there is a burning heat perceived about the heart and hypochondria, we know that from the attrition of the vessels and humours being increased, we are to expect all those disorders in the viscera, there seated, which we before enumerated among the effects of heat (§ 689.) But here the lungs are seated, through which the blood ought to pass freely to continue life; and when the humours begin to stagnate impervious in the ultimate extremities of the pulmonary vessels, from the inspissation of them by heat, or if these very tender vessels are broke by the increased impetus of the fluid to be transmitted, there is the greatest danger threatened, as no one can in the least doubt. But in the hypochondria are placed the liver and spleen, such tender viscera, that there is the greatest danger of a rupture in their vessels, when an increased heat about these parts denotes a more violent attrition; and from hence again the worst consequences are to be expected. Thus the reason is evident why the antient physicians (who always very diligently are used to consider the hypochondria in diseases, deriving many prognostics from their swelling, pain, heat, pulsation, &c.) always suspected something bad, when they perceived a greater heat about these parts than in the rest of the body. Thus Hippocrates [k] *Qui in hypochondrio, refrigerata febre, ardores re-*

lin-

[k] Hippocrat. Lib. I. prorrhetic. Charter. Tom. VIII. pag. 705.

linquuntur, tum alias, tum in ſudoribus, malum. In febribus circa ventrem æſtus vehemens, & oris ventriculi dolor, malum. Quod ſi caput & manus pedeſque frigeant, ventre & lateribus calentibus, malum. "In thoſe who have a burning heat left in "the hypochondrium, after the fever is abated, as "alſo in ſweats and other diſeaſes, it is a bad ſign [l]. "A violent burning about the abdomen in fevers, "and a pain about the mouth of the ſtomach is a "bad ſign. But if the head, hands and feet, are "cold, while the abdomen and ſides burn with "heat, it is alſo a bad ſign [m]." For then we know that the greateſt reſiſtances are ſeated about the vital viſcera, and that the blood is no longer propelled with its due force and quantity to the extreme parts of the body. From hence alſo we may underſtand why phyſicians foreknow a phrenzy to be inſtantly at hand from a great heat of the head (as we ſhall explain more at large hereafter at § 772.)

Heat putrefies: But putrefaction of itſelf does not produce heat.] The antient phyſicians placed the nature or eſſence of a fever in heat; and after them many of the moderns have perſiſted in the like opinion, as we obſerved in the hiſtory of fevers in general. But among thoſe cauſes from whence heat ariſes, or is increaſed in febrile patients, they have reckoned putrefaction [n]. This opinion ſeemed to them reaſonable, becauſe when vegetables putrefy, they produce a great heat; and ſometimes they even break out into actual flame, as appears from many fatal inſtances, when hay being gathered in too damp, has from thence, beginning

[l] Aphoriſm. 65. Sect. IV. Charter. Tom. IX. pag. 176.

[m] In Prognoſtic. Charter. Tom. VIII. pag. 622. & in Coac. N°. 492. ibid. pag. 880.

[n] Galen. de Febrib. Lib. I. cap. 4. Charter. Tom. VII. pag. 109.

ginning to putrefy, taken fire. Hence many hav believed that the intolerable heat of fevers ough to be aſcribed to putrefaction as the cauſe. Bu I believe it will appear to every one who conſider that putrefaction is rather the effect of heat in ou body, and not the cauſe of it; and even that pu trefaction once formed does not excite heat by it own proper force, but only inaſmuch as the cele rity of the humours through the veſſels, and con ſequently their attrition, are increaſed; from whenc we proved before that heat is generated in the body That heat putrefies was ſaid before in the com ment to § 84, N°. 5. as alſo at § 100, where w treated of the effects of an increaſed motion of th blood thro' the veſſels, which is always accompanie with a greater heat; even putrefaction never happen without a conſiderable heat [9]. And hence in th ſevereſt winter's cold many things continue a long time uncorrupted, which would ſoon putrefy by the ſummer's heat. But when putrefaction is onc finiſhed, the heat which attended during the actio ceaſes. When moiſt vegetables are laid in a hea to putrefy, a great heat ariſes, but when they ar once converted into a putrid liquid, they then re turn to the temperature of the ambient air: It i therefore evident that heat is both preſent and ne ceſſary during putrefaction, but when that i once accompliſhed, the putrefaction of itſelf doe not excite heat. Putrefaction is therefore unjuſtl reckoned a proximate cauſe of increaſed heat i the body, of which it is rather the effect; and the great heat in fevers is often obſerved befor there are any apparent ſigns of putrefaction ariſing Moreover, if putrefaction occaſioned heat, the bo dy after death would grow ſo much hotter, as i inclines more to putrefaction; as Helmont juſtly ar gue

[9] H. Boerhaave Chem. Tom. II. pag. 292.

es againſt the opinion of the ſchools, as we ob-
ved before in the comment to § 685. When a
olent phlegmon invades any part of the body,
great heat is perceived in that part; but when
ch a phlegmon degenerates into a gangrene or
hacelus, the very worſt putrefaction enſues; yet
the heat abſent, though the parts thus cor-
pted diſſolve into the moſt ill-ſmelling matter.
ut when the gangrenous matter abſorbed by the
ntiguous living veſſels, increaſes the velocity of
e humours by its ſtimulus, a greater heat en-
es throughout the body, even though the ſame
oldneſs continues in the parts already dead. There-
ore that increaſed heat then in the patient does
ot in the leaſt acknowledge putrefaction for its im-
ediate, but only for its remote cauſe; by which
ne motion of the humours being accelerated thro'
ne veſſels, the attrition whereon increaſes the
eat depends as its proximate cauſe. For if pu-
efaction formed produced heat of itſelf, the heat
f the ſphacelated part would then be greater than
nat in the reſt of the body.

SECT. DCXCIX.

FROM what has been ſaid likewiſe the origin, nature, and effects of dryneſs may be plainly perceived: And the cure may be thence pointed out, conſiſting in drinks, fomentations, baths, clyſters, and gargles, made of watery, ſubacid and relaxing ingredients, with honey.

Dryneſs is reckoned among the effects of febrile heat, as is evident from what was ſaid before at § 689. where it was demonſtrated that dryneſs both

in the ſolid and fluid parts of the body is produc
when too great heat attends. Therefore from wh
has been hitherto ſaid concerning febrile heat, t
origin of dryneſs with its nature and effects may
likewiſe underſtood. But a dryneſs of our fluids
ſaid to attend when there is a deficiency in the d
quantity of their watery vehicle to dilute them
whence the remaining particles of the fluids co
crete and unite together into large maſſes, incapab
of paſſing through the ultimate extremities of th
artery: but in the ſolid parts of the body the ſam
diſorder is ſaid to attend, when they become w
thered, rigid, and contracted. And therefore
dryneſs of the ſolid and fluid parts always ſuppoſe
a deficiency of the aqueous fluid, which ought na
turally to be preſent. But that a dryneſs attends
the phyſician knows if thoſe parts of the body ap
pear rough and dry, which naturally are alway
moiſt; which may be therefore more eſpeciall
diſtinguiſhed in the external ſurface of the bo
dy: and thence it is reaſonably concluded tha
the like diſorder takes place in the internal parts
Our ſkin is always moiſtened and relaxed by a very
thin vapour expreſſed from the exhaling arteries
and when this moiſture is deficient the ſkin be-
comes dry and rough, or hard and ſcaly, as we ſo
often obſerve as a fatal ſign in an ardent fever.
The internal parts of the noſtrils, tongue, gums,
palate, fauces, and whole internal mouth appear
all over moiſt in healthy people; and the eyes are
continually watered with a very thin lymph, which,
when abſent, makes them appear dry and duſty.
If therefore the natural moiſture is abſent in theſe
parts, which a prudent phyſician ought always to
inſpect in the cure of diſeaſes, we know that dry-
neſs attends; and that therefore all thoſe diſorders
are to be feared, which proceed from an obſtruc-

tion

ion of the courſe of the humours through the
malleſt veſſels. Upon another occaſion we men-
oned the ſigns by which one may be able to diſ-
over too great a diſſipation of the fluids, that is
o ſay dryneſs from too intenſe febrile motion (§
99, N°. 2.) where thoſe ſigns are enumerated.
But ſince dryneſs ſuppoſes a ſcarcity of our di-
ient humours, and that therefore they are in dan-
er of concretion and impervioufneſs, with a dry-
g up of the ſmalleſt veſſels, for want of being
oiſtened with their uſual fluids, it is evident
nough what remedies are required for the cure of
yneſs. For here we endeavour by all means poſ-
ble to reſtore that moiſture to the humours which
ey have been deprived of, namely, their diluent
hicle, which we know for the moſt part to be wa-
ry: whence the drinking of water, with fomenta-
ons, baths, clyſters, and gargles of the like, are
ken into the body, or applied to thoſe parts in
nich dryneſs is perceived; and by the ſame means
e ſmall veſſels are relaxed, which being contract-
by dryneſs deny any paſſage to the fluids to be
nſmitted. To the watery liquors are alſo ad-
d ſoft farinaceous ſubſtances, that the dry rigid
rts may be ſooner mollified; and that water uni-
with ſuch a ſoft glutinous ſubſtance, may, as
were, longer adhere to the parts, and not ſo
n eſcape from the body. But as dryneſs is al-
ys accompanied with a greater tenacity of the
od, therefore preparations with honey, the juices
ſummer-fruit, ſyrups and jellies made of theſe
added; that by theſe joined with water, the
ticles of the fluids may be more happily diſ-
ed, and by that means the free motion of the
nours may be reſtored through the pervious veſ-
: for this being effected, dryneſs will be abſent,
the former moiſture will return to all the parts

of the body. But as dryneſs uſually follows a greater heat, and heat diſpoſes to putrefaction, therefore acids are likewiſe added, and more eſpecially thoſe which diſſolve and attenuate the blood, ſuch as the acid juices of vegetables, crude or fermented, tart wine, vinegar, &c. By theſe means the dryneſs may be very eaſily allayed, and at the ſame time theſe diſorders will be corrected, which uſually accompany or follow dryneſs.

Of Delirium in FEVERS.

SECT. DCC.

A Delirium is the production of ideas not anſwerable to external cauſes, from internal diſpoſition of the brain, attended ith a wrong judgment following from thoſe eas, and an affection of the mind and otion of the body accordingly: and from eſe increaſed through various degrees either one or joined together, various kinds of de-ia are produced.

Etymologiſts derive the term delirium from *de* d *lira*, *i. e.* a departing from the right way; for *a* denotes a ſtrait ditch, carried through fields to ceive the moiſture of the earth; therefore a per-is ſaid to be delirious, when he thinks and acts t in the rght road or channel. Others rather uſe to derive the word ἀπὸ τῦ ληρεῖν, which is m λῆρος, trifles or abſurdities.

When a fierce and continual delirium attends h an acute fever, from the brain itſelf originally ected, it is called a phrenzy (ſee § 771): but his place we only treat of a delirium as a ſymp-n in fevers, which is neither conſtant or perpe-l, nor always derived from the brain itſelf ori-ally affected. Thus, for example, many peo-are delirious in the height of a violent fit of an ermitting fever, but when the paroxyſm is off delirium is again abſent; and ſuch a diſorder is ly diſtinguiſhed by phyſicians from a phrenzy, ſimply calling it a delirium. The antient Greeks

Greeks call this ſymptom παραφροσύνην, παραφροσύνην, &c.

But to rightly underſtand what is properly meant by a delirium, we ought to conſider the following particulars.

An idea is ſome thought or image of a thing perceived in the mind either at one time or at another. But ſo far as the ideas ariſe in us from external cauſes without ourſelves, they ſeem to depend on a change of the ſurface of the nerve excited by the contact of ſome moving object [p], but in ſuch a manner that the change may be propagated through a free nerve to ſome part in the medulla of the brain. But this ultimate change made in the medulla of the brain ſeems to be ſo ſimple, that it can hardly be ſearched out, much leſs can it be explained. But in the mean time from this change, whatever it may be, there ariſes a change in the thoughts of the perceiving intellect, which repreſents nothing either in the action of the object, or paſſion of the organ; but yet the ſame action of the ſame object upon the ſame organ always is followed with the ſame idea. But for the connection of the idea with that change of the brain, it is no ways conceivable, nor has it been explained by any one: yet it appears from the moſt certain experiments that the ſame changes are connected with the ſame alteration of the thoughts. Thus if I ſee a circle a thouſand times, I ſhall ſo often have the idea of the circle. If therefore the nerves, ſpirits, or medulla of the brain within the body are affected in the ſame manner from an cauſe conceived within the body, as they uſually are from external cauſes, changing the ultimate ſurface of the nervous ſenſitive organs, the like ideas will be excited. But this perception of an idea ariſing from a phyſical change in the internal inner

[p] Her. Boerh. Inſtitut. § 566, 568, &c.

innermoſt ſentient organ or common ſenſory from an internal cauſe is called imagination.

But that there are ſuch changes in the common ſenſory as ariſe without any external cauſes acting upon the organs of the ſenſes, we know from the ideas raiſed in us when we ſee, hear, and reaſon about various things in dreams, and are moved with paſſions of the mind, *&c.* ſo that nothing can affect a perſon who is awake, but the ſame may at one time or other offer itſelf in the ſleep. Moreover, we find in ourſelves a power of retaining that condition in the common ſenſory by the will, which ariſes from a diſtinct and vivid action of an object: and it is called attention, by which an idea is perceived a long time preſent in the mind, diſtinct, clear, and vivid. We have alſo the power of renewing ideas which have been before perceived by the actions of objects on the organs of ſenſe, even without a renewal of the action of the objects upon the ſenſes, as we are taught by the memory. We are alſo able to excite ſuch ideas as we never before perceived by the ſenſes, as when, for example, we invent ſomething chimerical in our imagination. From all which it is evident ideas may be raiſed from an internal change of the common ſenſory without any aſſiſtance from external cauſes.

A perſon is therefore ſaid to be delirious, when the origins of his ideas do not correſpond to external cauſes, but proceed from a change in the internal condition of the brain, raiſed without the influence of the will. For we ſometimes obſerve when patients begin to be delirious, that they ſee frightful appearances, which they ſo much deteſt that they endeavour to efface the ideas with all the force of their will, but yet are not able. But there are various degrees of deliria obſervable; for ſome-

times this change, arising from an internal cause in the common sensory, is so slight as to be less than those actions which are usually impressed by the force of things perceived by the senses; and in this case the ideas produced are easily effaced, and give way to those which arise by the perception of the senses: this is in a manner esteemed the first degree of delirium, when the patient begins to think he perceives objects by the senses, though at the same time by the admonition of those who were present, they readily find they were deceived. But when this internal cause acting upon the common sensory is so violent as to equal, or even exceed those changes which arise from the organs of sensation, no reason can then persuade the patient that such causes are not existing without himself; from whence these ideas were excited, and this more especially, if formerly the like ideas were excited from external objects: for then they most firmly believe such causes are renewed without themselves, and are very angry at their friends who are bold enough to deny such things as so evidently appear to them. This has been very well distinguished by Celsus *, where, in treating of a phrenzy, he says, *Phrenitis vero tum demum est, cum continua dementia esse incipit, aut cum æger, quamvis adhuc sapiat, tamen quasdam vanas imagines accipit: perfecta est, ubi mens illis imaginibus addicta est.* "But it is at length a "phrenzy, when there is a continual absence of "right reason or perception in the mind, or when "the patient, though able to perceive any thing, "yet forms to himself nothing but vain or false "ideas: but a perfect phrenzy is when the mind "attends to, or believes those imaginary ideas." For if this change, arising from an internal cause lodged in the common sensory, is so power-

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* Lib. III. cap. 18. pag. 148, 149.

ful as to exceed the effects of all other cauſes acting upon the ſenſory, then that idea will always remain preſent in the mind, and cannot be corrected by any manner of reaſoning. Yet in theſe unhappy patients the conſciouſneſs of the mind and baſis of the ideas remain equally firm as in thoſe who are well: but if any thing happens unexpectedly and of a ſudden to them, they talk reaſonably for a moment, but ſoon after theſe vivid impreſſions being effaced, they relapſe again into the ſame depravity of imagination.

But judgment follows from the ideas perceived. For there is in us a faculty of thinking of ſeveral ideas at one time, which ideas ſeem to be the ſame, or different from each other, and by ſimple intuition the thinking part in us ſees whether ſuch ideas agree, or are different from each other, and by that means judgment is formed. For all that in us which is called judgment, proceeds from the contemplation of the ideas in the cogitative part. Therefore in a delirious perſon an idea is raiſed from a change in the common ſenſory by an internal cauſe, and that idea being compared with its like formerly produced by external cauſes, acting upon the outward organs of ſenſe, and repreſented by the memory, there follows a judgment affirming that the like ideas proceed from the like cauſes; and therefore a delirious perſon firmly perſuades himſelf that ſuch cauſes are exiſting without, as formerly acting upon the organs of ſenſation excited the like ideas in the mind; namely, if the impreſſion from the internal cauſe is equally vivid in altering the common ſenſory with that which before aroſe by the organs of ſenſation affected by external objects.

But, as we obſerved before upon another occaſion (ſee the comment to § 104.) certain ideas are accompanied with ſomething pleaſing or diſpleaſ-

ing, which by inevitable neceſſity draws the whole mind to cauſe that which is agreeable to continue, and to remove or deſtroy that which is diſpleaſing. Each of theſe commotions of the mind ariſing from the pleaſure, or diſpleaſure attending the ideas, are called affections or paſſions of the mind. But theſe affections of the mind are followed with certain motions of the body, by which the perſon endeavours to remove or deſtroy that which is diſpleaſing, and to retain that which is agreeable; and hence when delirious people have ſuch ideas raiſed, as are able to excite violent paſſions of the mind, they jump out of bed, and injure thoſe who are preſent, exerting the greateſt exerciſes of body often with incredible force, and even for a long time together, in order to avoid what they believe injurious to them, or to get poſſeſſion of that which they deſire. Theſe are the deceptions of the mind, which Hippocrates [q] calls ravings (Θηριώδεες) when neither reaſon, nor threatnings, nor dangers, deter the unhappy patient from doing miſchief often to himſelf and others.

But ſince the ideas perceived are ſometimes adiaphorous or indifferent, having nothing in them either pleaſing or diſpleaſing; therefore the common ſenſory may be ſo affected in diſeaſes, that the patient becomes delirious even without any violent paſſions of the mind, or motions of the body attending the delirium. Of this kind ſeems to be thoſe deliria, concerning which Hippocrates [r] ſays, *Tremulæ, obſcuræ, deſipientiæ, & ubi ægri continuo quaſi attrectando aliquid palpant.* "They are ob-
"ſcure, trembling deceptions, wherein the patient
"is continually handling and feeling for ſomething,
"being very phrenetic." For Galen in his commen-

[q] Prædiction. Lib. I. text. 24. Charter. Tom. VIII. pag. 715. & alibi ſæpius. [r] Ibid. text. 33. pag. 721.

mentary to this place obſerves that this is the ſenſe of the word Ψαλαφώδεες, and that many people, and ſometimes even phyſicians err, when they do not believe patients are phrenetic unleſs they jump out of bed or roar out, and therefore theſe are juſtly called obſcure deceptions, when at the ſame time they are often of the very worſt conſequence, and therefore the knowledge of them is highly neceſſary. For ſince every delirium ſuppoſes the medullary part of the brain to be diſordered, as we ſhall declare in the aphoriſm next following, therefore in ſuch a caſe there may be great danger, though there does not appear to be any great tumult.

But if from ſuch a change of the common ſenſory, produced by an internal morbid indiſpoſition, ſuch ideas ariſe as never had their like before exiſting in the mind, in that caſe the mind is wholly ſurpriſed and diſturbed. Thus epileptic patients teſtify, that in the fit they have an idea of colours, ſmells, taſtes, *&c.* which they cannot compare to any as yet known. Thus in ſleep we have ſometimes ideas of ſuch things, concerning which we never before thought; whence it ſeems very probable that the like may ſometimes happen in diſeaſes. Perhaps this may be what Hippocrates points at in his Coan Prognoſtics [s], where he ſays, *In febribus mentis emotiones taciturnæ, in eo qui voce privatus non eſt* (μὴ ἀφόνῳ) *perniciosæ.* "That "ſilent commotions of the mind in fevers, in one "who is not deprived of his voice, are of bad "conſequence." For when ſuch unuſual ideas are raiſed, the patient is in a manner aſtoniſhed, and, as in great fear, they can hardly ſpeak. I remember to have ſometimes ſeen ſuch a delirium

[r] Prædiction. Lib. I. &c. text. 33. pag. 721.
[s] N°. 68. Charter. Tom. VIII. pag. 856.

in acute diſeaſes, where the patient has lain ſilent, and in a manner aſtoniſhed; while in the mean time their countenance has expreſſed the greateſt fear and admiration; and in many, not long after, dreadful convulſions have followed. If now ſomething greatly pleaſing or diſpleaſing attends this unuſual idea, it is ſufficiently evident what diſturbances are to be expected.

There are therefore apparently different kinds of deliria, according as the ideas ariſe ſimply, or from a change only in the diſpoſition of the brain by internal cauſes, differing again according to the greater or leſs violence of the impreſſion which ſuch ideas make. When judgment follows from the ideas thus perceived, it again makes another kind of delirium; and if the ideas are accompanied with pleaſure or diſpleaſure, they uſually raiſe paſſions of the mind, more or leſs impetuous, which are again uſually followed with motions of the body; whence again there is evidently another difference in deliria.

But ſince the paſſions of the mind have ſo great an influence (ſee the comment to § 104.), it is evident how wonderfully they may change the body, and that very different conſequences may enſue from a delirium, according as one kind or other of the paſſions of the mind are excited. For anger produces a very different change in the body from that of fear, and joy from that of ſorrow, &c. Hence Hippocrates[f] juſtly pronounces, *Quæ deliria cum riſu fiunt, tutiora; quæ cum ſtudio, periculoſiora.* "That thoſe who are delirious with a "laughter are ſafer, but thoſe who are ſtudious in "their delirium are more in danger." If now delirious people ſuſpect others have an ill deſign upon them, and refuſe all kinds of meat and drink, as we ſometimes obſerve, or if they avoid ſleep, through ſome vain fear of an imaginary enemy at hand,

[f] Aphor. 53. Sect. VI. Charter. Tom. IX. pag. 285.

hand, it is evident enough what dangerous conſequences are to be expected in a body already exhauſted; and this again Hippocrates obſerves in his Coan Prognoſticks[u]," *Deliria circa neceſſaria, peſſima.* "That a delirium with reſpect to neceſ-"ſaries is the very worſt." Having thus explained the nature of a delirium, and enumerated the principal varieties, from whence the reſt may be eaſily underſtood, it remains for us to examine into the cauſes, from whence it appears by faithful obſervations that a delirium may be produced.

SECT. DCCI.

A DELIRIUM therefore always ſuppoſes a morbid affection of the medullary part of the brain, ariſing from any kind of obſtruction, impeding the influx, transflux, and efflux of the humours through the brain, from a greater velocity, ſtagnation, and a great many other cauſes, whence it may ariſe, and to diſcover which diligent enquiry ought to be made in order to a cure.

Since therefore the internal diſpoſition of the brain is changed in a delirium, ſo that from thence ariſe ideas like thoſe which proceed from the actions of external cauſes upon the organs of ſenſe in healthy people; and as from thoſe ideas paſſions of the mind are raiſed, and theſe again are often followed with violent motions of the body; it is evident that this morbid indiſpoſition muſt affect that part of the body upon which the perception of thoſe changes depends, which are excited from external objects by the nerves in all parts of the bo-

[u] N°. 100. Charter. Tom. VIII. pag. 857.

dy, and from which part motions are excited by the nerves diſtributed to the muſcles. But it appears directly from experiments, that a free communication is required by the nerves, betwixt the encephalon from whence the nerves derive their origin, and the organs for exciting the perception of the ſenſes, and exerciſing the motion of the muſcles: for if this communication is intercepted by ligature, or any other way, the ſenſe and motion of the part is deſtroyed, to which the tied nerve is conveyed. Thus alſo when the brain is compreſſed by humours extravaſated within the ſkull, all the ſenſes and voluntary motions are effaced, as we ſaid before in the hiſtory of wounds of the head. There is therefore a certain part in the brain from whence all the nerves, deſtined to the performance of the ſenſes and voluntary motions derive their origin; and to which part the changes produced in the nerves are conveyed, and there excite ideas, paſſions of the mind, motions of the body, &c. but this part of the brain, wherever it is, has been uſually called by phyſicians the common ſenſory, from whence proceeds a change of the thoughts from a change of the body, and a change in the body from a change in the thoughts. But, as all the nerves, ſo far as we have been able to diſcover by anatomy, are perfectly diſtinct both in their courſe and origin, and are never united with each other, like the blood-veſſels, but remain ſeparate, it is evident the common ſenſory is a collection of all thoſe parts in the brain, from whence the medullary fibres, conſtituting the ſubſtance of the nerve properly ſo called, derive their origin from that part of the brain, which is termed the cortical ſubſtance. It is therefore evident that a delirium always ſuppoſes a morbid affection of the medulla of the brain, becauſe in that medulla is the part upon which our ideas depend.

But as it ſeems evident from phyſiology [w] that the whole medullary ſubſtance of the brain ariſes from the vaſcular compages of the cortical ſubſtance, whoſe vaſcular fabric is demonſtrated by anatomical injections, and as the medulla ſeems to conſiſt of ſmall veſſels continuous with the cortex, and tranſmitting the thinneſt fluid of the whole body, it is evident that in this part all thoſe diſorders may take place, which are obſerved in the larger veſſels containing the groſs fluids. For here obſtruction may take place, while, for example, theſe very tender veſſels are ſtraitened by ſome external compreſſing cauſe. For whatever impedes the influx, transflux, and efflux of the humours through the brain, may produce a delirium, becauſe it diſturbs the ſecretion and motion of the nervous ſpirits, through the nerves and medulla of the brain itſelf. Moreover, we ſee that in the other viſcera it is neceſſary for the humours to flow through the veſſels conſtituting their ſubſtance with a certain determinate velocity; and that the functions of thoſe viſcera are diſturbed either from their too rapid, or too ſlow motion: and therefore the ſame will be alſo true in the brain. Perhaps many are delirious in the greateſt ſeverity of the fit of intermitting fevers, only from a greater velocity; and therefore the delirium ceaſes in theſe, when the velocity is diminiſhed by the declining of the paroxyſm; all the cauſes therefore of obſtruction and inflammation, together with their conſequences, may here take place; and every thing capable of accelerating or retarding the circulation too much may likewiſe produce a delirium, inaſmuch as they impede or diſturb the motion of the humours through the brain; and therefore it is evident

[w] H. Boerhaave Inſtitut. Medic. § 284.

dent that this diſorder may ariſe from many cauſes.

But all the cauſes hitherto mentioned, whereon the morbid diſpoſition of the medulla of the brain ariſes, producing the delirium, are ſeated in the brain itſelf. But in the mean time the common ſenſory may be ſo affected by other parts of the body injured, as if the phyſical cauſe preexiſted in the brain itſelf, when at the ſame time the origin of the diſorder lies in parts very remote. This is a thing of the greateſt moment in the practice of phyſic, as is eaſily apparent, and therefore it deſerves a ſerious conſideration.

The antient phyſicians have remarked the ſigns of a future delirium from the changes obſerved in other parts of the body. Thus Hippocrates [x] ſays, *Quod ſi in hypochondrio pulſus quoque inſit, perturbationem ſignificat vel delirium. Juxta ventrem in febre palpitationes mentis emotiones faciunt.* "That if a pulſation attends in the hypochondri-" um, it ſignifies either a delirium or a diſturb-" ance. That palpitations about the belly in a " fever cauſe diſturbances of the mind [y]." Even Galen [z] openly pronounces, *Quod fiant epilepſiæ, cari, comata, catalepſes, deliria, melancholiæ quibuſdam ob ſtomachum imbecillum, conſentiente principio, quod in cerebro & nervis eſt.* "That epi-" lepſies, cari, comata, catalepſies, deliria, and " ſome kinds of melancholy, ariſe from a weak " ſtomach, by its conſent with the principal part " contained in the brain and nerves." And in another place [a], ſpeaking of the mouth of the ſtomach, he has the following paſſage: *At quædam (par-*

[x] In Prognoſt. textu 28. Charter. Tom. VIII. pag. 611.

[y] Coac. Prenot. No. 299. Charter. Tom. VIII. pag. 869.

[z] De Symptom. cauſis. Lib. I. cap. 7. Charter. Tom. VII. pag. 60. [a] Commentar. 2. in Hippocrat. de victu in morbis acutis, Charter. Tom. XI. pag. 71

(partes) quamvis propius appositæ non sint, ob generis tamen communitatem, vel quandam affectionis proprietatem, partes facultatum principia continentes lædunt. Os igitur ventriculi, quum vitalem facultatem ad sympathiam ducat, syncopas infert; quum vero animalem proprie appellatam, deliria vel convulsiones. "But some parts, though "they are not seated near, yet injure the princi- "pal containing parts of the faculties, either from "their consent, or from some peculiar affection. "Therefore the mouth of the stomach drawing "the vital faculty by sympathy, occasions faint- "ings; but when it injures the animal faculty pro- "perly so called, deliria or convulsions ensue." But altho' it appears, from the history of wounds, that the common sensory may be disturbed from injuries in various other parts, and some of them very remote, which also appeared from what was said under the titles of pain and convulsions; (and as will hereafter be proved when we come to treat of melancholy, raving madness, epilepsy, &c.) yet a delirium considered as a febrile symptom is very frequently observed to attend when the cause of the disorder is seated about the præcordia, which cause being removed, the delirium is also removed, though no remedies at all be applied to the head.

But the term præcordia has been used in various senses. Thus Pliny [b] calls by this title the bowels or viscera: But in another place [c] he says, *Exta homini ab inferiore viscerum parte separantur, membranis, quæ præcordia appellant, quia cordia prætenduntur, quod græci appellaverunt phrenas.* "That "the viscera of the thorax in a man are separated "from the lower viscera by membranes, which they "call the præcordia, because they are extended un- "der the heart, and which membranes the Greeks "have

[b] Lib. XXX. cap 5. pag. 736.
[c] Lib. XI. cap. 37. pag. 285.

" have called phrenæ." And it is evident from what follows this paſſage, that Pliny aſcribes the name of præcordia to the diaphragm. But in many other places he ſpeaks of the ſoftneſs and hardneſs of the præcordia as obvious to the touch, and therefore he aſcribes this name to other parts. Alſo in Celſus [d] there is frequent mention made of the præcordia being hard, ſoft, ſwelled, *&c.* whence it is ſufficiently evident that the term præcordia is uſed to ſignify the ſame in him with hypochondria, uſed by Hippocrates and the other antient Greek phyſicians. But this name ſeems intended not only to include thoſe parts ſeated under the cartilages of the ribs, but likewiſe the whole contained alſo in the epigaſtrium. Therefore at preſent it has been cuſtomary to underſtand by the name præcordia all thoſe parts lodged in that ſpace, which may be conceived betwixt the diaphragm and a perpendicular plane erected about the end of the diaphragm upon the loins, dividing the abdomen into two; and therefore the term præcordia includes the cardia, hypochondria, and epigaſtrium.

A faithful obſervation in diſeaſes has taught us that foul humours lodged about the præcordia, (whether from an indigeſtible matter taken in and corrupted, or from a morbid contagion, or from humours ſpontaneouſly ſeparated and not diſcharged, but ſtagnating and corrupting here) may diſturb all the actions of the brain, and produce deliria, ravings, and other ſymptoms of the worſt conſequence. There are even ſome marks of this to be found in Hippocrates [e], for he ſays a phrenzy may ariſe *A bile, quando commota ad viſcera & ſeptum tranſverſum reſederit.* " From bile, when, " being diſturbed, it is lodged about the viſcera " and

[d] Lib. III. cap. 20. pag. 159, 160. & pluribus aliis locis.
[e] De affectionib. cap. 3. Charter. Tom. VII. pag. 622.

and diaphragm." How great a power medi-
ines and poiſons ſometimes have upon the brain,
hough they lie only in the ſtomach, from whence
eing diſcharged, all the diſorders are immediately
elieved, was ſaid before upon another occaſion in
he comment to § 229, N°. 2. Helmont obſerving
his to happen in many diſeaſes, namely, that the
naterial cauſe of the diſeaſe was ſeated very diſtant
rom that part in which the effects of the morbid
auſe were obſerved; he therefore called this pow-
r, by which one part being affected, diſturbed an-
ther, the action of rule or government; a new
kind of phraſe, but not very improper [f]. But
his ſeems to have been the opinion of Helmont,
hat there is a ſort of power inherent in every part
f the body, by which they can act upon other
iſtant parts without any corporeal contact; but
o that there is not the like rule in each part, but
nly in ſome [g]. *Hæc eſt enim actio regiminis, ſive dependentiæ, quaquaverſum radians, penetranſque, abſque colligationis lenocinio: attamen nonniſi ad objectum proprium.* "For this, ſays he, is the action
' of regimen, or of the dependance ſpreading it-
' ſelf every way in rays penetrating without being
' confined or determined, unleſs to the proper ob-
' ject." And therefore ſoon after [h] he ſays; *Regimen eſt, qua una pars paret alteri*; "Regimen is
' that whereby one part governs another." But
experiments only demonſtrate this action of regi-
men, or rule of one part upon another, though
he manner in which that action is brought about
s not well underſtood. Thus the beard begins to
grow in man at the age of puberty, when the pro-
lific ſemen begins to be formed, and the beard is
abſent

[f] J. B. Helm. in Capitulo: *Ignota actio regiminis*. p. 268, &c.
[g] Ibid. pag. 269. N°. 38.
[h] Ibid. pag. 270. N°. 40.

abſent in thoſe who have been caſtrated, and in ſuch there is often a wonderful change in the whole body and the inclinations of the mind: But by theſe effects following after a removal of the teſticles in thoſe who are caſtrated, Helmont endeavours to demonſtrate the action of regimen, which the teſticles have upon the other parts. Hitherto he refers the various affections of the uterus in the female ſex, which ſometimes diſorder the gula, ſometimes the lungs, ſtomach, *&c.* with great anguiſh, and often ſurpriſing ſymptoms; and he explodes the opinion of the ſchools, who derived all theſe diſorders from malignant vapours aſcending to theſe parts from the uterus. Moreover, he believed this action of regimen might be conſidered [1], *Vim, quæ lucis inſtar totum corpus, vel objecta ſaltem ſua, afficit & diſponit, juxta donum & fines ſibi a Creatore ſeminaliter implantatos.* "As a force which "like light diffuſed itſelf thro' the body, or "like that at leaſt ruled and diſpoſed the body, or "its proper organs, according to the uſes or ends "aſſigned them by the Creator." For unleſs this force, which he calls the action of regimen, was limited to certain parts by the Creator, why ſhould the beard rather grow out of the chin than the forehead or any other, ſince the influence of the teſticles is diffuſed throughout the whole? It is ſufficient for the phyſician to know by experience thoſe wonderful powers which ſome parts of the body have over others, although perhaps thoſe, who do not indulge themſelves in ſubtle diſputes, will ingeniouſly confeſs, that they do not plainly underſtand the manner in which this was brought about. Helmont indeed would have this action upon diſtant parts to be performed without any intervention of the body, but this would be very difficult to prove.

[1] Ibid. pag. 272. N°. 47.

prove. For all the parts of the body are so united together, that Hippocrates[k] says, *Principium corporis mihi quidem nullum videtur, sed partes omnes peræque principium, omnesque finis. Descripto namque circulo, principium non invenitur. Eademque ratio morborum in toto corpore.* "There seems in "my opinion to be no beginning to the body, "but every part is equally the beginning and "equally the end; as when a circle is described "no beginning can be found. And the same "reasoning takes place with respect to diseases "throughout the whole body." And a little after he subjoins the following words, which ought more especially to be remarked, *Singulæ vero corporis partes, altera alteri, quum huc vel illuc impetum fecerit* (ὁρμήσῃ), *statim morbum facit. Venter capiti, & caput carnibus ac ventri; & reliquæ omnes eadem ratione, quemadmodum venter capiti, & caput carnibus ac ventri.* "But every part "of the body labours the one for the other, and "when once the impetus has settled upon this or "the other part, it immediately produces a dis-"ease. Thus it is betwixt the belly and the head, "and betwixt the head, muscles, and abdomen: "and all the rest, in the same manner as the belly, "are affected from the head, and the head from "the belly and viscera." This whole chapter of Hippocrates deserves to be read, wherein are contained many other passages belonging to the same subject; whence I believe it will appear, that Helmont had not this opinion as a new one, tho' he delivered it in other words, and endeavoured to explain it by various and extraordinary instances. Nor is it wonderful that this uncommon sort of writer should have extracted many things from the

[k] De. locis in homine cap. 1. Charter. Tom. VII. pag. 357

the antient phyſicians, ſince he confeſſes[1] that he had twice read the works of Galen, and once thoſe of Hippocrates, whoſe aphoriſms he had almoſt got by heart; that he had read Aviſenna through, with above ſix hundred more of the Greek, Arabian, and modern writers, not only reading them with care and attention, but writing down in a common place-book whatever he thought ſingular, and worthy of his notice. He ſays indeed that it gave him ſome uneaſineſs to reflect upon the work he had undertaken, and the number of years it employed, when reading over his collections he found them of ſuch little worth. But it ſeems very probable that he had not entirely loſt the memory of what he had read, though he afterwards indulged himſelf only in meditations upon what he had exhauſted from the antients, laying down the moſt valuable part of others in different words, as new and unheard of, though perhaps he might have forgot that he originally extracted thoſe ideas from the antient phyſicians, to whom he does not ſeem to do juſtice throughout his writings.

But ſince the nerves are diſperſed throughout the whole, and every part of the body, all ariſing from the ſame origin, namely, the encephalon, and all entertaining the ſame free commerce with their origin: and as the ſpirits or *impetum faciens* of Hippocrates is by the efficacy of the will determined to certain parts of the body very remote from the encephalon through the nerves, without any ſenſible interval of time betwixt the will and conſequent motions; and on the other hand the nerves being changed by external objects, the thoughts are immediately altered; it therefore ſeems

[1] J. B. Helmont. in Capitulo: *ſtudia authoris*, pag. 16. N°. 15.

ſeems very probable that this action of regimen, whereby one part of the body influences another, proceeds from the nerves. This opinion ſeems to be farther confirmed, becauſe this influence upon other parts, and even upon the common ſenſory itſelf, is obſerved to be greateſt where the nerves are moſt numerous, and more eſpecially where the large trunks of the nerves are placed; which, by branching out into very ſmall twigs, are diſtributed into many other parts. Hence ſuch an influence has been in all ages obſerved in, and aſcribed to the upper orifice of the ſtomach, by the ſides of which paſs the trunks of the eighth pair, which give numerous branches to the ſtomach. It is therefore no wonder that foul humours collected here, or bile rendered ſpontaneouſly more acrid, or corrupted, and put in motion by the fever lying in the ſtomach, ſhould diſturb the whole common ſenſory, or that theſe foul humours being evacuated, all the diſturbances ſhould immediately ceaſe. But in the mean time we find nothing in ſuch caſes except only a ſimple contact of the nerves in the fabric of the ſtomach, irritated by theſe foul humours, nor do we underſtand the manner in which thoſe changes are made in the common ſenſory from ſuch a cauſe. Yet it is ſufficient for a phyſician to know that deliria, convulſions, &c. may ariſe from ſuch things lodged in this part, though he continues perfectly ignorant of the manner in which it is brought about; becauſe if he knows this, he will eaſily find his curative indication, which directs the immediate removal of theſe humours. *Optimum enim eſt, ad curationem ægrotantium partium accedere per eas, quæ morbos faciunt; ſic enim quam optimè quis ægrotantis partis principio medebitur.* "For it is the beſt to endeavour the cure of diſeaſed parts by applying remedies immediately to thoſe which

" cauſe the diſeaſe ; for by this means one may
" beſt relieve the part which is principally diſor-
" dered [m]."

Being admoniſhed by the incomparable Boerhaave, that the cauſe of delirium in fevers was frequently foul humours collected about the præcordia; by attending afterwards to this ſymptom I often found it true; for immediately after giving a vomit, by diſcharging the corrupt humours, I recollect many have inſtantly recovered themſelves.

Since therefore a delirium happens in fevers from ſuch very different cauſes, it is evident enough that theſe ought firſt to be carefully diſcovered, in order to enter upon a proper method of cure. The ſigns of too great a velocity, ſtagnation, obſtruction, inflammatory, or cold glutinous lentor, whereby the influx, transflux, and efflux of the humours may be hindered through the brain, have been given before in their proper places. But, that foul humours are collected about the præcordia, we know chiefly from the following ſigns: a foul tongue, a bitter, diſagreeable taſte in the mouth, nauſea, vomiting, and oppreſſion or anguiſh; and this diagnoſis is confirmed if there are no ſigns teaching that there are other cauſes from whence a delirium may be expected.

[m] Hippocr. de locis in homine, cap. 1. Charter. Tom VII pag. 358.

SECT

SECT. DCCII.

FOR a various method of cure and different remedies are to be chose agreeable to the difference of the causes (§ 701;) but the chief of these remedies are warm bathing or washing of the feet, with the application of blisters to them, and to the hams; frictions upon the same parts, diluent clysters often applied, thin diet, and healing, quieting, deobstruent, and diluent drinks; emollient remedies applied to the head, vomits sometimes, and purges, gentle anodynes, bleeding in the foot, a bringing down of the piles or menstrual discharge, *&c.*

But as this internal disposition of the brain, upon which the delirium depends, is observed to take place in different degrees (see § 700) so as to raise only simple ideas easy to efface, since there is a less change in the common sensory, arising from the internal cause, then are those impressions, which arise from the actions of external objects upon the organs of sensations; or such ideas raised in those who are delirious have so violent a change in the common sensory for their cause, that it equals, or even exceeds the actions of external objects, and then it affects the judgment with the passions of the mind, which are often followed with the most impetuous motions of the body; and then it is often hardly practicable to efface the present condition of the common sensory, even though the cause be removed, which first gave rise to the disorder. And

ſince, from the violent paſſion of the mind and motions of the body thence following, the very worſt conſequences are to be feared in diſeaſes, it is evident that all poſſible care ought to be taken to diſcover and cure the delirium at its firſt appearance, by attending to thoſe ſigns which denote a delirium is already beginning, or will ſpeedily follow. Galen [n] illuſtrates this by a very good compariſon: For as plants of the moſt common uſe, when they firſt riſe up out of the earth are only to be known but by ſkilful gardeners, but when adult are eaſily known by every one; ſo alſo a fierce delirium, in which the patient riſes out of his bed raving, roars out, and endeavours to injure the byſtanders, *&c.* is concealed from no one; but when that internal diſpoſition of the brain begins to be formed as the cauſe of a future delirium, the diſorder lying as yet concealed in obſcurity, can only be known by ſkilful phyſicians. This is the reaſon why Hippocrates [o] ſo carefully enumerates thoſe ſigns which indicate the danger of a future delirium: *Curationem enim optime inſtituet, qui ea præſentibus affectibus futuros præviderit.* "For "he will be beſt able to make a cure, who foreſees the diſorders that are about to happen from "the preſent ſymptoms." But ſince it is of ſo much importance to foreſee a future delirium, it will be of uſe to collect together theſe ſigns from Hippocrates, who ſays; *Pronum in ventrem cubare, cui non aſſuetum eſt etiam ſano ſic decumbere delirium ſignificat, aut dolorem locorum circa ventrem. Dentibus ſtridere, quibus non conſuetum eſt a pueritia, inſaniam & mortem portendit. Magna & longo tempore facta reſpiratio delirium ſignifica*

[n] In Commentar. in Lib. I. Prædict. Hippocr. Text. Charter. Tom. VIII. pag. 693. [o] Hippocrat. in Prognoſt. Sentent. 3. Charter. Tom. VIII. pag. 584.

Si in hypochondrio pulsus insit, perturbationem significat, vel delirium; verum oculos eorum intueri oportet. Si enim crebro moveantur, exspectanda insania est. Vigilia futurum delirium præsagit. Si absceſſus critici in morbis prodeuntes diſpareant iterum, delirii periculum adeſſe & interitus, monuit. *Auris dolor acutus, cum febre continua & vehementi, gravis. Periculum enim eſt, hominem delirare & interire. In capitis doloribus æruginoſi vomitus cum ſurditate & pervigilio citam inſaniam ſignificant. Linguam aſperam & aridam* inter Phrenitidis ſigna recenſuit. *Linguam tremulam* pro ſigno non conſtantis mentis habuit. *Faciem bene coloratam & torvum aſpectum* huc pariter retuliſſe videtur. " For one to lie upon his belly, who is not " accuſtomed to lie ſo when he is well, denotes a " delirium, or a pain about the parts of the abdo- " men [p]. A gnaſhing of the teeth in thoſe who " are not accuſtomed to it from their childhood, " denotes madneſs and death [q]. A great reſpira- " tion, which is a long time in performing, de- " notes a delirium [r]. If there is a pulſation in the " hypochondrium, it ſignifies a diſturbance or de- " lirium; but then the eyes of ſuch ought to be " examined; for if they are moved about ſwiftly " madneſs is to be expected [s]. Watchings preſage " a future delirium [t]. If critical abſceſſes appear- " ing in diſeaſes vaniſh again, there is danger of " a delirium and death [u]. An acute pain of the " ear with a violent continual fever is bad, for " there is a danger that the perſon will periſh de- " lirious [w]. Vomitings of eruginous bile in pains " of the head, with deafneſs and ſevere watchings,

[p] Hippocrat. in Prognoſt. pag. 603. [q] Ibid. pag. 604.
[r] Ibid. pag. 607. [s] Ibid. pag. 611. [t] Ibid. pag. 625.
[u] Ibid. pag. 657.
[w] Ibid. pag. 670.

" ſignify a ſpeedy delirium or phrenzy [x]. A rough " and dry tongue he ranks among the ſigns of a " phrenzy [y]. A trembling of the tongue he " makes a ſign of an inconſtant or unſound mind [z]. " The face well coloured and of a fierce aſpect he " likewiſe adds to the former ſigns [a]." But among the principal ſigns of a future delirium, he has the following: *Præter conſuetudinem aliquid facere, vel aliquid magno ſtudio curare* (προθυμέεσθαι) *prius non conſuetum, aut contrarium: pravum ac delirio proximum.* " For a perſon to do any thing unuſual, " or to be very careful or intent upon any thing " to which he has not been accuſtomed, or even " averſe, is bad, and denotes the delirium to be " at hand [b]." For it denotes that the ſenſorium begins to be diſturbed, whence the judgment and paſſions of the mind proceed. Hitherto are alſo referred, *Ferox reſponſum in homine moderato*; " A " fierce anſwer from a perſon of a mild diſpoſi- " tion [c]; and indecent actions in a well-behaved perſon, ſuch as the *flatus ſonori emiſſio*, " blowing " out of his breath with a noiſe [d]," unleſs this appears to be done by the patient with deſign: *Manus ante faciem attollere, muſcas quaſi venari inani opera, floccos carpere de veſtibus, vel pariete.* " The " lifting up his hand before his face, a catching " as it were at flies, when there are none, pulling " of lint from off the bed-cloaths or curtains [e]." And this laſt Galen [f] experienced in himſelf. For in his youth lying ill of an ardent fever from over-heating

[x] Hippocr. Prorrhet. Lib. I. Charter. Tom. VIII. pag. 706.
[y] Ibid. pag. 698. [z] Ibid. pag. 713. & in Coacis, N°. 234. ubi inſtar dubii proponitur hoc ſignum, pag. 865. [a] In Coacis, N°. 214. Ibid. pag. 864. [b] Ibid. N°. 48. pag. 855.
[c] In Prorrhetic. Lib. I. Charter. Tom. VIII. pag. 730.
[d] In Prognoſticis, ibid. pag. 630, 631. [e] Ibid. pag. 606.
[f] De locis affectis, Lib. IV. cap. 2. Charter. Tom. VII. pag. 455.

eating himself, he imagined straws of a black colour to stick out from the sides, and fleeces of wool of the like kind from the bed-cloaths, which when he endeavoured to pull off, and found nothing in his fingers, he attempted it again with more diligence. But while he was employed thus he heard two of his friends standing by say, *Jam & floccos hic evellit & festucas colligit.* "He now pulls off the flocks and gathers straws." But immediately when he understood he did this, he advised his friends to use their endeavours to prevent him from falling into a phrenzy; from which history also fairly appears that first degree of delirium, in which the ideas arising from the internal disposition of the brain are not followed with judgment, nor passions of the mind. For Galen observes, that it thus appeared to his mind, *Ut rationalis facultas non vacillaret*; "that the rational faculty was not wandering," and therefore he advised his friends to be careful of him. There are many more signs of a future delirium to be found interspersed in several parts of the writings of Hippocrates; but the forementioned are the chief and most frequent.

But since the causes of a febrile delirium may be so different, it is evident enough that no universal method of cure can be delivered, but that different remedies are required according to the variety of the causes. For a very different method of cure is required, when an inflammatory thickness occasions the blood to hesitate in the vessels of the encephalon, than if the person was delirious from his body being exhausted by the continual fever. But since a delirium considered as a febrile symptom is generally accompanied with a greater velocity of the circulation, therefore every thing which diminishes the quantity of the humours, or diverts

their impetus towards other parts, and which act by weakening or removing the ſtimulus, and, by diluting or attenuating the humours, render them duly pervious, or allay their too great impetuoſity, are here to be eſteemed as the principal remedies. But ſuch are thoſe hereafter enumerated.

Warm bathing or waſhing of the feet, with the application of bliſters to them, and to the hams, with frictions upon the ſame parts.] All theſe derive the impetus and quantity of the blood towards the lower parts of the body, and conſequently divert it from the head or encephalon. For the blood propelled from the heart by the aorta aſcends partly upward, and partly downward by the deſcending trunk of the aorta; if therefore the veſſels of the lower parts are relaxed, by that means the reſiſtance to the blood will be leſſened, which is about to flow into thoſe veſſels; whence it is evident a greater quantity of blood muſt flow towards the lower parts, by which means a true revulſion will be made from the encephalon. But for this purpoſe a vaporous bath is principally of uſe, becauſe it more powerfully relaxes and ſoftens, while at the ſame time there is no danger of compreſſing the veſſels by the weight of the fluid into which the parts are immerged. For it appears from hydroſtatics, that fluids preſs upon bodies immerged into them, and that this preſſure increaſes in proportion to the height of the incumbent fluid. If therefore the feet are immerged to a ſmall height in warm water, while at the ſame time care is taken to let the vapours of the water come into contact on all ſides with the lower parts of the body, this intention will be fairly anſwered; and at the ſame time likewiſe the erect poſture of the body will be very ſerviceable (ſee the comment to § 610.) But the tumor and redneſs of the parts expoſed to ſuch a bath ſuf-

ſufficiently prove that the humours are derived in a greater quantity towards them. But bliſters act inaſmuch as by their ſtimulus they irritate the veſſels of the part to which they are applied into more frequent and violent contractions, that is to ſay, they accelerate the motion of the vital humours through the veſſels, which by this means emptying themſelves oftener in the ſame time, they will tranſmit a greater quantity of fluids. But frictions by emptying the veins make way for the blood to paſs more eaſily through the arteries to empty themſelves into the depleted veins, and therefore both the quantity and impetus of the vital humours will be derived towards thoſe parts to which the frictions are applied. But it is very evident that epiſpaſtics, if made of the more acrid ſubſtances, and frictions, ought to be applied with ſuch moderation as only to increaſe the motion of the humours through the lower parts, without increaſing it much through the whole body (ſee what has been ſaid concerning all theſe in the comments to § 134 and 396, N°. 4.)

Diluent clyſters often applied.] For thus the fæces are waſhed out, the veſſels of the inteſtines are relaxed and fomented, and conſequently the impulſe of the humours is diverted from the head, while at the ſame time a diluent liquor may by theſe paſſages be communicated to the blood to advantage. But how much uſe clyſters are of in quieting the too great impetus of a fever, as it is frequently the cauſe of a delirium, was ſaid before upon another occaſion in the comment to § 610. If therefore a fierce delirium urges, ſuch a clyſter ought to be injected every three hours, till the diſorder abates; but care is to be taken in the decline of the diſeaſe not to weaken the patient's ſtrength too much by the too frequent uſe of theſe.

Thin

Thin diet.] Namely, nothing ought to be given that can either increaſe the reſiſtance or ſtimulus of the blood: But what ſort of diet is convenient in this caſe has been ſaid more at large in the comment to § 599. Decoctions of barley, oats, rice, and the like, emulſions prepared from theſe, and the mealy ſeeds, ſaponaceous acidulous ſubſtances, as oxymel, the juice, of ſummer-fruits, or their ſyrups and jellies, which are kept ready prepared in the ſhops of confectioners, are very uſeful, and ſufficient for this purpoſe. For as Celſus [g] very well obſerves in the cure of a phrenzy: *Moderatio in cibo quoque adhibenda eſt: nam neque æger eſt implendus, ne inſaniat; neque jejunio utique vexandus eſt, ne imbecillitate in cardiacum incidat. Opus eſt autem cibo infirmo, maximeque ſorbitionis, & potione aque mulſæ, &c.* "Moderation is likewiſe to be "obſerved in the food, for the patient is neither to "be filled to prevent a phrenzy, nor yet is he to "be puniſhed with faſting, leſt by weakneſs he "ſhould faint. But there is occaſion for weak "food, more eſpecially ſuppings, and drinks with "honey, *&c.*

Soft, quieting, deobſtruent, diluent drinks, *&c.*] Theſe may be prepared of the like ingredients, for the only diluent in this caſe is water, to which afterwards ſuch things are to be added as are fit to diſſolve the obſtructing cauſe. Decoctions of the roots of graſs, ſcorzonera, German vetches, *&c.* are here of the greateſt uſe. Spirit of vitriol dropped in ſmall beer has been very uſeful, as Sydenham [h] teſtifies, who gave this as common drink to ſuch patients.

Emollient remedies applied to the head.] For when emollient and relaxing medicines are applied to

[g] Lib. III. cap. 18. pag. 153. [h] Sect. V. cap. 2. pag. 289.

to foment the external parts of the head, the reſiſtance is diminiſhed in thoſe veſſels diſtributed to theſe parts, and which ariſe from the external carotides. Thus the impetus and quantity of the blood is therefore diverted from the encephalon, and in this reſpect ſuch medicines are uſeful. For the blood, drove through the carotid arteries, will preſs with a leſs force againſt their internal trunks, as it meets with a leſs reſiſtance in the external carotides. And hence Hippocrates [1] ſays, that to waſh the head much with warm medicines is very uſeful even in a phrenzy.

Vomits ſometimes.] For although the face ſwells in vomiting, the eyes water, and look red with blood, a vertigo, and noiſe in the ears, with many other ſymptoms are obſerved, which plainly denote that in vomiting the blood diſtends the veſſels, and is derived in a greater quantity towards the head, yet ſometimes emetics fairly cure the deliria. But theſe are of uſe in that caſe where corrupt bile or other foul humours are lodged about the præcordia producing the delirium, (as we ſaid before in the comment to § 701); for then theſe humours being evacuated, the diſorder ceaſes. But by what ſigns this may be diſtinguiſhed was likewiſe ſaid in the place laſt cited. But if the delirium ariſes from an inflammatory cauſe, it is very evident that emetics are entirely pernicious; becauſe then in vomiting, as the blood is urged with a greater quantity and force to the head, the diſtended veſſels will be in the greateſt danger of burſting; or elſe the impervious blood will be further propelled into the narrow extremities of the veſſels, ſo as to increaſe the diſeaſe. But when the ſigns teach that foul humours, lodged about the præcordia,

[1] De Affectionibus cap. 3. pag. 622. Charter. Tom. VII, pag. 622.

præcordia, are the cauſe of the delirium, though at the ſame time there is ſome reaſon to believe that the blood abounds in quantity, or retains an inflammatory thickneſs, in that caſe a vomit may be given with much more ſafety after bleeding has been firſt premiſed. Concerning this cauſe of a delirium Helmont well obſerves [k]: *Helmontius quod ſagittator delirii & amentiarum habitet in præcordiis*, &c. *Quod autem ſagittatoris ſcopus ſit cerebrum, ut deliria & ſopores excitet, non debet movere Medicum, ut proinde capiti remedium adhibeat: ſiquidem id ſemper eſt ad poſterius, ad tela vibrata, non autem ad ſagittatorem remedia adhibuiſſe.* "That it reſides in the præcordia, but exerts its effects in the brain, ſo as to excite deliria and ſleepy diſorders; but the phyſician ought not therefore to apply remedies to the head, as that is not the ſeat of the cauſe, but rather to the præcordia." But Helmont was miſtaken in ſuppoſing this to be almoſt the univerſal cauſe of a delirium, when yet it is certain a delirium may ariſe from other topical cauſes ſeated in the head itſelf.

Purges.] Theſe may be uſeful two ways; firſt, inaſmuch as they evacuate the offending humours lodged about the præcordia: 2. inaſmuch as they leſſen the too great impetus of the arterial blood, (ſee § 396. N°. 2.) and drive it from the head towards other parts; (ſee § 396. N°. 4.) and at the ſame time they diminiſh the too great quantity of the fluids diſtending the veſſels. But in this caſe thoſe purges are principally recommended which diſſolve the humours without exciting any great diſturbance in the body; ſuch as tamarinds, cream of tartar, leaves of ſena, rhubarb, ſal polychreſt, and the like.

Gentle

[k] De Febribus, cap. 11. N°. 13. pag. 771.

Gentle anodynes.] Here more eſpecially are recommended wild red poppy flowers, with the ſyrups and diſtilled waters prepared from them in the ſhops, for in theſe there is not ſo great a ſtupefying power obſerved, but they are only gentle anodynes which allay too great an impetus of the humours, and gently quiet the diſturbances raiſed in the ſpirits. But the ſtronger narcotics are to be avoided in a febrile delirium, as pernicious, by the univerſal teſtimony and conſent almoſt of every phyſician, unleſs the diſorder has continued a long time. Sydenham [1], in treating of this febrile ſymptom, obſerves that blood-letting, clyſters, and cooling remedies, ſupport patients who are thus affected ſo long, that the diſeaſe runs out to a conſiderable length, and then a narcotic given in a large doſe has always a very good effect. But, when ſuch a medicine is given in the beginning, increaſe, or height of the fever, accompanied with this ſymptom, he has remarked, that it was either of no uſe, or elſe frequently miſchievous; and therefore he never gave it before the twelfth day of the diſeaſe. But when a vomit or purge was given in the beginning of ſuch a diſeaſe, he then gave a paregoric the ſame evening, in order to quiet the diſturbance which they had raiſed in the body. Otherwiſe he abſtained from anodynes, 'till the diſeaſe manifeſtly declined.

Bleeding in the foot, bringing down of the piles or menſtrual diſcharge.] For by all theſe means the quantity of the diſtending blood is diminiſhed, and the too great velocity of the circulation leſſened, while the impetus thereof is diverted from the head, by giving the blood a free diſcharge through the open veſſels in parts very remote from the head. Phyſicians have in all ages obſerved theſe ſalutary endea-

[1] Sect. I. cap. 4. pag. 81.

endeavours of nature, by which a profuſe hæmorrhage being raiſed by an opening of the vital arteries, has often freed the patient from the moſt dangerous diſeaſes. How uſeful a profuſe hæmorrhage from the noſe is in acute diſeaſes, when it ariſes ſpontaneouſly, will be made appear more evidently in the hiſtory of thoſe diſeaſes. And that a phrenzy itſelf is ſometimes thus terminated, Galen [m] informs us. Hence the antient phyſicians have given us ſo many ſigns, whereby it might be known whether any ſuch evacuation is to be expected in diſeaſes. But the bringing down of the piles have always been obſerved to be uſeful in diſeaſes of the head: and no wonder, ſince the hæmorrhoidal veſſels and carotid arteries convey the blood in oppoſite directions, whence a very great avulſion might be reaſonably expected. That the piles are uſeful to apoplectic patients [n], and that even madneſs itſelf has been this way removed, is remarked by Hippocrates [o]. But it is not in the power of the phyſician to perform theſe ſpontaneous evacuations at pleaſure for the cure of diſeaſes; but the whole power of art conſiſts in forwarding and directing nature in the way to which ſhe naturally inclines, and to open and lubricate the paſſages, by which ſhe endeavours to make theſe evacuations. If therefore the phyſician knows that the patient being delirious was before ſubject to the piles, or if the pain, redneſs, and itching about the anus, with a teneſmus or fruitleſs endeavour to go to ſtool, teach that ſomething of this nature is to be expected, theſe parts are to be continually fomented by a vaporous bath, ſoft cataplaſms applied

[m] De Criſibus, Lib. III. cap. 3. Charter. Tom. VIII. pag. 430. [n] In Coacis Prænotionibus, N°. 478. Charter. Tom. VIII. pag. 880. [o] Aphor. 21. Sect. VI. Charter. Tom. IX. pag. 26.

plied to the anus, or clyſters prepared with the ſame ingredients; this being done, if the piles do not yet appear, the parts may be irritated with ſuppoſitories, ſal gem boiled with honey, and eſpecially with the addition of aloes, which by continual obſervation we know to be a moſt effectual remedy to excite the piles. As ſoon as theſe varicoſe ſwellings begin to appear about the anus, they are to be fomented with the moſt emollient applications, that they may ſwell the more; and afterwards it is uſual to rub them with the rough leaves of a fig-tree, in order to break them, or elſe to puncture them with a lancet, that the blood may have a free diſcharge from them. But the moſt frequent practice is to apply leaches to the turgid piles, which kind of inſect making a wound, uſually ſucks the blood 'till it is full, and then drops off, after which the piles continue to bleed, more eſpecially if at the ſame time the patient ſits in a chair with a hole at the bottom, ſo that the parts may be fomented with the vapours of hot water. But the delirium is commonly relieved immediately as ſoon as the piles begin to bleed; nor will it ever be hurtful to try theſe remedies, becauſe by fomenting and irritating the lower parts of the body, there is always reaſon to hope for a revulſion from the head.

For the ſame reaſon likewiſe it will be uſeful to provoke the menſes in women; but then this is to be attempted by ſuch remedies as relax and mollify the parts, and not by thoſe remedies which are called emmenagogs, moſt of which increaſe the impetus and velocity of the circulation, being often applied with ſucceſs in women of a lax and cold habit; and therefore a relaxation or bringing down of the menſes is juſtly recommended in the text, to which purpoſe conduce waſhing of the feet, epi-

ſpaſtics and frictions of the lower parts, which we recommended before under the preſent aphoriſm; and which may be therefore ſafely uſed. But it is very evident that this may be more eſpecially attempted with hopes of ſucceſs, when the uſual time of this periodical diſcharge is at hand, or when the pains in the loins, groins, thighs, and tenſion in the neck, with other ſigns, denote that the menſes are about to flow ſooner than uſual, as is frequently obſerved in acute diſeaſes. When theſe means are tried, if an irruption of the menſes does not follow, a vein may be opened in the foot, after the performance of which the menſes frequently break forth. Such a blood-letting likewiſe ſupplies the deficiency of the piles or menſtrual diſcharge, by making this artificial evacuation of blood in a part the moſt remote from the head. But all theſe evacuations are only uſeful, when the veſſels are diſtended with too great a quantity of blood, or when the force of the circulation is too violent, and a revulſion of the humours is neceſſary to be made from the head. For when in the end of acute diſeaſes a delirium continues, though the diſeaſe has almoſt exhauſted the patient's ſtrength, all evacuations are then prejudicial, and an imprudent uſe of them is frequently attended afterwards with an incurable fooliſhneſs. But a weak and ſmall pulſe, ſlight heat, and collapſion of the veſſels readily denote that in the preſent caſe ſuch evacuations are not to be uſed.

But all the remedies which have been hitherto propoſed, act either by diſcharging the offending humours from the body, or by leſſening the quantity of the blood, and diverting the impetus of it from the head, and directing it towards other parts; or laſtly, by quieting the diſturbances excited in

the body by the uſe of gentle anodines. But beſides theſe, there are ſtill other methods of cure, by which that diſpoſition of the brain from whence the delirium proceeds is either leſſened or quite changed by raiſing other ideas. For as ſometimes ſuch ideas are raiſed as continue a long time in the ſenſory, and cannot be removed without difficulty, when the action of the external object is extremely vivid, and eſpecially when it is perfectly new and unuſual; ſo it ſeems very probable that ſuch ideas may be raiſed from an internal diſpoſition of the brain made by diſeaſe, which ideas can hardly be effaced, even tho' the morbid cauſe from whence they proceeded is already moved. Thus I knew a man, who having ſeen the puniſhment of breaking upon the wheel, he could not efface the idea which it raiſed for three whole days, but it returned every moment in his mind, even againſt his will. Almoſt the ſame thing obtains in ſome delirious people, and in ſuch a caſe it ſeems convenient to expunge the impreſſion by exciting other ideas.

There are many obſervations in medical hiſtory which favour this opinion. A celebrated muſician, extremely ſkilful in his art, lay ill of an acute, continual, remitting fever, and on the ſeventh day of the diſeaſe was taken with a very bad kind of delirium, almoſt without any intermiſſion, attended with great clamours, weeping, frights, and perpetual watchings. On the third day of the delirium, the patient inſiſted on having a concert of muſick performed in his chamber, to which the phyſician with ſome difficulty complied. But immediately hereupon the patient's ſerenity of mind and countenance returned, the convulſions ceaſed, and he cried with joy, from the perceiving of ſuch a pleaſure, which he never before or after that diſeaſe perceived from the moſt agreeable harmony

whatever. Even what is wonderful, the fever wer off as long as the concert of muſic continued, an when that ceaſed, all the diſorders immediately re turned. This unexpected ſucceſs gave occaſion fo repeating this wonderful remedy, which was al ways followed with the like ſucceſs, namely, ceſſation of the fever and delirium. The patien having experienced this relief, obliged his nurſe t ſing, and even to dance in the night-time; an thus by continuing this remedy for ten days he wa perfectly cured[p]. The like inſtance is likewiſe re corded in the memoirs of the Royal Academy o Sciences at Paris[q], where the cure was thus obtain ed ſooner in a dancing-maſter. Thus I have ſeen (as I mentioned before upon another occaſion i the comment to § 11.) a patient immediately re cover from a very bad delirium, upon hearing tha his neighbour's houſe was on fire, and being alarm ed by the cries of the people running up an down the yard. For having hitherto ſpent both day and night delirious, of a ſudden he aſked the by-ſtanders what was doing without doors, and upon hearing there was a fire in the neighbour hood, he was greatly frighted, but at the ſame time ſoon recovered himſelf, and was no longer delirious. Even in thoſe deliria, where the patient is every moment ſupplied with new ideas, as their inconſiſtent diſcourſe teſtifies, it is often uſeful to offer ſuch things as may fix the attention of the mind. Thus I have known the dropping of water from a high place into a copper baſon, af fording a gentle ringing noiſe, to have been of great uſe when made in the chamber of a delirious patient. For the patient, by attending ſome time to the ſound, has grown leſs delirious, and ſome times

[p] Academ. des Sciences l'An. 1707. hiſt. pag. 8.
[q] Ibid. l'An. 1708. hiſt. pag. 27.

imes fallen into a ſoft ſleep, which has afforded reat relief. Something of this nature has been lready obſerved by Celſus[r], when he ſays, *Interum etiam elicienda ipſius intentio: ut ſit in hominius ſtudioſis literarum, quibus liber legitur, aut rec-, ſi delectantur; aut perperam, ſi id ipſum eos ofndit. Emendando enim advertere animum incipint.* "Sometimes alſo the attention itſelf is to be engaged; as happens in ſtudious or learned men, to whom a book may be read either rightly, if they are delighted with it, or corruptly if it offends them; becauſe they begin to apply their minds towards correcting it." Many things of ne like kinds may be tried to fix the attention of ne mind in the cure of a delirium: nor will it perhaps be amiſs to endeavour to change the preſent ondition of the common ſenſory by exciting a ſudden fear, joy, or ſome other violent affection of the ind. But at the ſame time the greateſt prunce is neceſſary not to raiſe new diſturbances; d at the ſame time the paſſions of the mind thus cited, ought to be contrary to thoſe which are eady preſent in the delirious patient, as Celſus[s] udently obſerves; *Quorundam enim vani metus lendi ſunt: ſicut in homine prædivite, famem tinte, incidit, cui ſubinde falſæ hæreditates nunciantur. Quorundam audacia coërcenda eſt: ſicut in fit, in quibus continendis plagæ quoque adhiben. Quorundam etiam intempeſtivus riſus objurgane & minis prohibendus eſt. Quorundam diſcundæ triſtes cogitationes: ad quod ſymphoniæ, & nbala, ſtrepituſque proficiunt. Sæpius tamen aſtiendum, quam repugnandum eſt: paulatimque & evidenter, ab his, quæ ſtultè dicuntur, ad meli- mens abducenda.* "For ſome (ſays he) are to be immediately relieved of their vain fears; as

[r] Lib. III. cap. 18. pag. 151. [s] Ibidem.

" when a rich man falls into a fear of ſtarving, to
" whom falſe reports ought to be made of eſtates
" left to him. Some again are to be reſtrained by
" threatening attempts, as happens in thoſe who
" require to be confined alſo by ſtripes. Some
" again are to be reſtrained by unſeaſonable laugh-
" ters, quarrelings, and threatnings. Some require
" to have ſorrowful thoughts removed; for which
" purpoſe concerts of muſick and great noiſes are
" uſeful. But they are oftener to be humoured
" than oppoſed in their way of thinking, and the
" mind is to be brought by degrees, and not all at
" once, from thoughts ſaid to be fooliſh to ſuch as
" are more reaſonable."

Although therefore it may be laid down in general as a practical rule, that ſuch patients as are in danger of a future delirium, or are already delirious, ought to be kept in a dark place free from all noiſe; which method is juſtly recommended by the antient phyſicians, as Celſus [t] teſtifies: Yet it is ſometimes ſerviceable, at leaſt in ſome caſes, to depart a little from this rule. Aſclepiades [u] recommends the contrary method, condemns darkneſs, and chuſes to have the patient expoſed to the light. But neither of theſe can be perpetual, as Celſus [w] rightly affirms; for ſome are diſturbed by darkneſs, and others are offended by light; and therefore he orders both of theſe to be tried, that it may appear by their effects which is the moſt convenient. I well remember to have ſeen ſome delirious, who fearing an invaſion from an enemy, were greatly enraged if they were confined to darkneſs; but they raved much leſs if the light was admitted. But it is not proper to

expoſe

[t] Lib. III. cap. 18. pag. 149.

[u] Ibidem & apud Cælium Aurelianum Acut. morbor. Lib. I. cap. 15. pag. 46. [w] Ibidem.

expoſe ſuch patients to a ſtrong light, but it is ſufficient for them to be able to diſtinguiſh the adjacent objects in a faint light. But in all theſe caſes reſpect muſt be had to the cuſtom of the patient before he was taken ill. For as Aretæus* ſays in treating of thoſe phrenetic patients, to whom ſleep may be reconciled: *Cuique vero uſitata ſomnum accerſunt: nautis in cymba decubitus, & in mari navigatio, & littorum ſonus, & undarum murmur, & ventorum bombus, & maris naviſque odor. Muſico tibiarum exercitatio quietem adfert, aut lyræ cantus, aut citharæ.* "Such things in-"cliné people to ſleep, to which they are accuſ-"tomed: As to ſailors, the lying in a boat, the "toſſing upon the ſea, the noiſe of the ſhore, "and murmuring of the waves, with the rat-"tling of the wind, and ſmell of the ſhip and ſea "air. To a muſician, the playing upon a pipe, "or ſinging to the harp or lute give reſt or ſleep." Which is fairly confirmed by the two inſtances lately mentioned from the memoirs of the Royal Academy of Sciences at Paris.

* De Curat. morbor. acutor. Lib. I. cap. 1. p. 75.

Of a Coma or Dozings in Fevers.

SECT. DCCIII.

A Coma or Drowſineſs in Fevers is a continual inclination to ſleep, either with or without its real effects; and it always ſuppoſes the brain to be in ſuch a ſtate as impedes the free exerciſe of the ſenſes and animal motions; which may ariſe from a defect of the arterial fluid propelled to the brain, or from its circulation impeded through the brain, or from an impeded ſecretion of the ſpirits from the blood into the nerves; or, laſtly, from the flux and reflux of them being intercepted through the nerves.

The term Coma is ſometimes only ſuppoſed to denote ſleep among the poets and other authors [y], but in Hippocrates, and other phyſicians after him, it is uſed in a different ſenſe; for a coma is the introduction of ſleep, although ſleep is not always preſent together with a coma, but ſometimes there are alſo watchings, as is evident from many paſſages cited from Hippocrates and Galen. But the term coma ſimply taken ſeems to be uſed by Hippocrates only to denote a deep ſleep, and is often oppoſed to watchings: but when watchings attended together with the coma, he calls it a coma vigil, or a coma without ſleepineſs. Whence afterwards,

[y] Vide de his Galen. de Comate, cap. 1, 2, 3. Charter. Tom. VII. pag. 192, &c.

terwards, for diſtinction's ſake, phyſicians have been accuſtomed to call it *coma comatodes*, or *hypnodes*, where there is a perpetual inclination to a deep ſleep in diſeaſes, hardly to be avoided; but ſo that the patient may be wakened by any ſtrong ſtimulus, tho' they ſoon after fall again into a ſleep. But they called it a *coma agrypnodes*, or *coma vigil*, when the patient laboured under an inſuperable ſleepineſs, but meeting with frightful dreams as ſoon as they are on the brink of ſleep, they ſuddenly awake in a fright, and often with convulſions, but ſoon after they again fall into the like ſleepineſs. This diſorder is often ſo troubleſome to the patient that his friends deſire he would be careful not to ſleep again afterwards. This diſorder is very frequent in children 'till they are ſeven or eight years old, when they are afflicted with continual or intermitting fevers. Galen [z] treating of theſe two kinds of comata or cataphora, very well diſtinguiſhes betwixt them in the following manner: *Commune enim ambarum eſt, quod tollere non poſſint oculos, ſed mox graventur & dormire velint. Proprium vero alterius, quod illi ſtatim dormiant profundè & diu: hi vero vigiles verſent ſe, alia ſuper aliam phantaſia adveniente, & mentem movente, & ſomnum intercidente: unde ſemper quidem vigiles manent, ſurgere verò non poſſunt, & agere illa, quæ vigilantium, ſed deficiunt magis quam ſi vigilarent, & gravantur, & cataphora detinentur, ut ſpheres, ſi conceſſeris eis, facile dormituros: conceſſo autem iis hoc, nedum dormiunt, ſed ne ſpem quidem, quam habebant ut dormituri, ſervant.* 'That it is common to both of them for the patient not to be able to open his eyes, but they are ſoon again heavy and inclined to ſleep. But it is peculiar to one kind that the patient im-

[z] Galen. de Comate, cap. 2. pag. 195.

" mediately falls into a profound ſleep, and con-
" tinues ſo for a long time: but in the other kind
" the patient continues watchful, one thought ari-
" ſing after another, diſturbing the mind, and in-
" terrupting the ſleep: whence indeed they al-
" ways remain watching, but are not able to riſe
" up and perform thoſe things which are uſual in
" a perſon who is awake, but they are more ſtu-
" pid than if they were awake, and are continual-
" ly inclined to ſleep, ſo that one would hope they
" would readily fall aſleep, if an opportunity was
" given them: but ſuch opportunity being given,
" they neither ſleep, nor entertain the hopes of
" ſleeping, which they had before."

Since therefore a coma ſuppoſes a continual ſleepineſs, whether ſleep follows or not, this ſymptom may be beſt underſtood from what we obſerve in natural ſleep. But it is demonſtrated in our theoretical lectures or inſtitutes [a], that ſleep is that ſtate of the medulla of the brain, wherein the nerves do not receive ſo ſtrong and copious an influx of ſpirits, as is neceſſary to render the organs of ſenſe and motion eaſily and readily capable of performing their ſeveral actions. The like diſpoſition therefore takes place in the preſent diſorder. The ſpirits being conſumed in health by the actions of the external and internal ſenſes with the motions of the muſcles, natural ſleep follows: thus likewiſe a coma will attend when the ſpirits are deficient, or when the free courſe of them from the brain to the nerves, and from the nerves to the brain, is impeded by any cauſe. For, ſince a due quantity of the ſpirits is neceſſary for the exerciſe of the ſenſes and animal motions; and likewiſe a free courſe of them is equally neceſſary, it is evident thoſe actions will be impeded when either of theſe are deficient. But

[a] Herm. Boerh. Inſtit. § 593.

But we know from phyſiology that the arterial blood, drove from the left ventricle of the heart through the carotid and vertebral arteries, ſupplies the matter from whence that moſt ſubtle fluid, which we call the ſpirits, is ſeparated by the fabric of the brain, and therefore a deficiency of the ſpirits may alſo proceed from an impediment of the impulſe of the arterial blood to the brain; whether that proceeds from a diminution of the quantity of the arterial blood, or from an obſtruction any way formed in the arteries conveying the blood. But, ſince a ſecretion of the ſpirits requires not only an impulſe of the arterial blood, but likewiſe a free circulation of it through thoſe veſſels of the brain, which conſtitute its cortical ſubſtance, it is evident the diſorder may alſo lie in theſe veſſels obſtructed. But for a due ſecretion of the ſpirits to be made, requires the blood from whence it is ſeparated, to be applied with due force to the ſecerning organs, and that the veſſels be pervious which receive the ſecerned fluid. If therefore by too great a velocity of the circulation, or any other cauſe, the ſmall veſſels of the cortical ſubſtance are filled with the groſſer humours, they will ſwell and compreſs the adjacent ſmaller veſſels, ſince they are all in this part ſo ſoft, and like a pulp; and therefore the ſecretion will be impeded or diſturbed; ſo that although the ſpirits are ſeparated, they may yet be denied a free courſe through the ſmalleſt tranſmitting veſſels, if they are compreſſed by the other adjacent veſſels too much diſtended. Laſtly, although the ſecretion be duly made, and a ſufficient ſtock of ſpirits be preſent in the medullary veſſels of the brain which receive that moſt ſubtle fluid prepared by the cortical ſubſtance, yet the ſame diſorder may follow if the motion of the ſpirits is impeded through the

nerves.

nerves. But for this to be performed in all the nerves which are ſubſervient to the ſenſes and muſcular motions, it is ſufficiently evident that the diſorder muſt be lodged about their origin: for it can hardly be conceived, that the free motion of the ſpirits can be impeded at the ſame time through all the other nerves, from ſuch a cauſe as is able thus to affect each of them alone, but not together in their common origin. But all the nerves paſs out of the medulla oblongata, which contains the medullary ſubſtance of the brain and cerebellum collected together, or elſe from the medulla ſpinalis, which is a production of the medulla oblongata, continued through the cavities of the vertebræ. But the medulla oblongata is covered with the pia mater, which we know abounds with great numbers of veſſels, demonſtrated by injections; and the nerves extended from the medulla oblongata, receive membranous coverings from the dura mater, as ſoon as they paſs out of the ſcull. If therefore theſe membranes, inveſting the medulla oblongata, or the nerves propagated from thence, are inflamed and ſwelled, the motion of the ſpirits may be impeded through the nerves, even though there is a good ſecretion of them made in the brain, and a ſufficient quantity ſupplied by the arterial blood. All the cauſes therefore, of what kind ſoever, which too much leſſen the quantity of the arterial blood to be impelled to the brain, which impede the free circulation through the veſſels of the brain, obſtruct the ſecretion of the ſpirits, or intercept the free motion of them through the nerves, when ſecreted, may produce a coma; namely, a coma ſomnolenta, if all the animal actions are laid aſleep equally by ſuch an impediment: but a coma vigil ſeems to take place when the motion of this moſt ſubtile fluid is not impeded through the

moſt

moſt ſenſible parts, as it is through many others; hence ſome parts of the common ſenſory are agitated with a greater impetus and irregular motion than others, and the ſpirits flow into certain nerves more powerfully than into others; and therefore, when ſome patients are awaked in a fright with convulſive motions, they ſoon after relapſe again into their former ſleepineſs; and thus are they tortured alternately by theſe diſorders.

SECT. DCCIV.

HENCE a great many very different, and often oppoſite cauſes, produce this diſorder in fevers, ſuch as all profuſe evacuations or repletions; all inſpiſſations of the blood to too great a degree, whether glutinous, oily, or inflammatory; all cauſes, of what kind ſoever, compreſſing the brain itſelf; which ſame cauſes acting upon the nerves, produce almoſt the ſame effects.

From what has been ſaid under the preceding aphoriſm, it is evident, that a great many and different cauſes, which are almoſt oppoſite, produce a coma; which yet, for the ſake of method, may be reduced to ſome certain general heads.

Profuſe evacuations.] Namely, ſo far as by theſe the maſs of the circulating humours is diminiſhed, or as the quantity of the arterial fluid to be ſent to the brain is deficient. This ſymptom is often obſerved after profuſe hæmorrhages at the noſe, and when after a miſcarriage, or delivery, almoſt the whole maſs of blood is evacuated by the open veſſels of the uterus. Thus we ſee in ſlaying animals, that when almoſt the whole quantity of

of blood is run out, they begin to ſnore, and are ſoon after violently convulſed. The like ſymptoms alſo follow after other profuſe evacuations; either by purging, vomiting, *&c.* as is more eſpecially obſervable in the cholera morbus; in which diſeaſe there is a profuſe evacuation of the humours, both upward and downward, with great violence, ſo as to exhauſt the body of the ſtrongeſt man, even in a few hours time.

Repletions.] This we are taught from a plethora, or too great a quantity of good blood. For ſince naturally there are no red blood-veſſels in the cortical ſubſtance of the brain, but the meninges of the brain only are thus vaſcular, and there are conſiderable arteries and veins, which run down perpendicularly through the medullary fabric, inveſt the medulla oblongata, and are found interwoven within the ventricles of the brain; it is very evident, that all theſe veſſels being diſtended with too great a quantity of blood, muſt compreſs the cortex of the brain with the medulla and origin of the nerves, becauſe the hard ſcull will not ſtretch or give way. Hence the reaſon is evident, why plethoric people are lazy and ſleepy, as we ſaid before in the comment to § 106. ε, where we treated of the ſigns of a plethora. Hitherto alſo belong all thoſe cauſes which urge the humours in too great a quantity towards the head; ſuch as too great a repletion of the ſtomach, which then contracting both its mouths with a convulſive force, becomes greatly diſtended by the rarefaction of its contents, compreſſes the deſcending trunk of the aorta and adjacent viſcera, and by that means occaſions the blood to flow in a greater quantity through the upper branches of the aorta, (as we ſaid before upon another occaſion in the comment to § 586, N° 1.)

All

All inſpiſſations of the blood to too great a degree, whether glutinous, oily, or inflammatory.] For to continue the due exerciſe of the ſenſes and animal motions, requires a free circulation through the veſſels of the brain, which ſuppoſes a due perviouſneſs of the humours. But now there are principally two kinds of inſpiſſation obſervable in the blood, and which are produced from oppoſite cauſes; namely, the one glutinous and inactive, uſually attending coldneſs and a ſlowneſs of the circulation, concerning which we treated under the title of diſeaſes ariſing from a ſpontaneous glutinoſity; and this is known from a pale colour, and a bloated, leucophlegmatic habit of body, being a diſorder moſt frequent to virgins, and women of a lax habit, leading an idle life, and alſo to ſuch as are far advanced in years. The other has an inflammatory lentor of the blood for its cauſe, and is uſually accompanied with a greater heat and increaſed velocity of the circulation; and thus it is eaſily diſtinguiſhed from the former. But when in corpulent people the fat is diſſolved by the febrile heat, and returning into the veins, is mixed in a great quantity with the blood, it occaſions an oily impervioufneſs of the humours; for oil has a greater tenacity or inaptitude to motion than water, and therefore it will be more difficult for it to paſs thro' the ſmalleſt veſſels. See what has been ſaid upon this ſubject in the comment to § 693.

All cauſes compreſſing the brain itſelf, &c.] In the hiſtory of wounds of the head we made it appear, that if the brain was compreſſed by an indentation of the ſcull, or an extravaſation of the humours, the conſequences were drowſineſs, ſleepineſs, giddineſs, delirium, and an injury of all the animal functions, even to a fatal apoplexy; and that according to the different degree of compreſſure,

preſſure, all theſe diſorders were either more ſlight, or more violent. No wonder therefore if a coma may be produced from the ſame cauſes compreſſing the brain. But in a febrile coma this compreſſure of the brain generally ariſes from a diſtenſion of the larger veſſels, either from too great a quantity and impetus, or an impervioufneſs of the blood; or elſe likewiſe from humours extravaſated in the ventricles of the brain, or collected in other parts. But if the ſame cauſes, capable of compreſſing the brain, act upon the nerves about their origin, or upon the medulla oblongata, from whence the nerves ariſe, the ſame diſorders will evidently follow: for the exerciſe of the ſenſes and animal motions requires a free communication by the nerves betwixt the brain and the organs of ſenſe and motion.

SECT.

SECT. DCCV.

HENCE again it is evident, that the particular cauſe ought firſt to be diſcovered by its proper ſigns, before the phyſician can determine what remedies are proper to be uſed, and the manner how they are to be applied: for often contraries are neceſſary, and frequently a coma continues obſtinate a long time, inflexible to all means that are tried, but at length it ceaſes ſpontaneouſly, when the concoction of the febrile lentor is accompliſhed.

It is therefore evident from what has been ſaid, that proper attention muſt be given to a febrile coma, by firſt carefully examining into and detecting the cauſe from whence this febrile ſymptom derives its origin: For, according to the variety of the cauſe, often a different, and even ſometimes an oppoſite method of cure is required. For if, for example, a coma ariſes after profuſe evacuations, only mild juices filling the veſſels, will be ſerviceable; but, on the contrary, in a plethoric perſon, or when the humours being rarefied by an intenſe febrile heat, too much diſtend the veſſels of the brain, in that caſe blood-letting, cooling purges, &c. are ſerviceable, which would have been very prejudicial in the former caſe. Thus alſo very different remedies are required when a cold glutinous lentor has rendered the blood impervious, to what are neceſſary when the diſorder is from an inflammatory tenacity. Therefore no general method of cure can be preſcribed; but the

the whole depends upon firſt knowing the particular cauſe of this diſorder.

But ſince a coma frequently ariſes in fevers becauſe the larger blood-veſſels, being over diſtended, compreſs the pulpy fabric of the cortex, and by that means hinder the ſecretion of the ſpirits into the nerves; therefore ſuch a coma has been frequently obſerved to remain inflexible, though the moſt efficacious remedies are uſed. Nor will this be ſurprizing, if we conſider that the arteries diſperſed through the encephalon are deſtitute of their callous coats, and are therefore but little elaſtic. But in the cure of an inflammation in this part we highly recommended the method of diminiſhing the vital impulſe of the fluids urging againſt the obſtructions, by making a copious evacuation with a lancet (ſee § 400) that the veſſels by their proper elaſticity contracting might repel back their obſtructing particles towards the larger capacity of the veſſels, from whence they may paſs into the larger branches; and this being effected, the inflammation is reſolved. At the ſame time alſo the obſtructing matter is rendered fluid, when the quantity of the diſtending blood being leſſened by bleeding and purging, the veſſels recover their elaſtic vibrations (ſee § 398, N°. 1.), by which they grind the impervious particles together with the diluent liquid, and by that means diſſolve them. But this can hardly be expected from the very tender veſſels of the encephalon, ſince they are deſtitute of theſe elaſtic coats. The intereſt of the patient is therefore badly conſulted, when phyſicians continue leſſening the quantity and impetus of the humours too much by bleeding, purging, clyſters, *&c.* becauſe in a delirium or coma ariſing from hence, the ſymptoms do not leſſen according to expectation. For the vital powers are then ſo far

weakened

weakened, that they cannot afterwards ſubdue, move, ſeparate, and expel the morbific matter (ſee § 609. N°. 3): from whence afterwards many and often incurable diſorders follow. The beſt method that can then be taken ſeems to be ſo to moderate the force of the fever by evacuations and other proper remedies, that there may be no danger of the impervious blood being drove farther into the narrow extremities of the veſſels, and in the mean time the patient ſhould ſit up erect ſeveral times in a day: the impetus of the blood is to be derived from the head by bathing the feet, with the application of epiſpaſtics, and the patient's ſtrength is to be ſupported by ſuch food and drink, as will not be in danger of increaſing the circulatory motion and reſiſtances. For thus by the moderate and gentle heat of the body, with the uſe of diluent and attenuating liquors, the obſtructing matter may be diſſolved, which is impacted into the veſſels. For in the hiſtory of contuſions we made it appear, that thus very large ecchymoſes are diſſolved by degrees, when the coagulated blood is lodged immediately under the entire ſkin, ſpontaneouſly diſſolving and diſappearing.

What has been already mentioned is fairly confirmed by the obſervations of Sydenham[b]. Namely, in an epidemical fever attended with a ſleepy coma, there was ſometimes a ſlight delirium preceded the coma: nor was the coma inconſiderable, for the patients ſometimes ſlept for ſeveral weeks; and could not be waked but by the moſt violent clamours, ſoon after relapſing again into their former ſleep. But as here the violent pains of the head and ſides frequently returning, and the blood extravaſated appearing as it uſually does in a pleuriſy, demonſtrated that this fever was attended with

[b] Sect. V. cap. 2. pag. 278. & ſeq.

a violent inflammation, he therefore treated it as an inflammatory diſeaſe. But as this great phyſician was always very attentive in obſerving whether the means uſed in diſeaſes were of ſervice or diſſervice; he found that this fever would not admit of ſo large an evacuation in bleeding, as was neceſſary in a pleuriſy. Therefore after once bleeding he ordered a clyſter to be injected every day, to moderate the too great violence of the fever (ſee § 610) and at the ſame time he endeavoured to divert the febrile matter from the head, to which in this diſorder it had great inclination. He took care to have a large bliſter-plaiſter applied to the neck, and at the ſame time ordered the medicines and diet to be cooling; and by this means, he ſays, the diſeaſe went off almoſt ſpontaneouſly, even tho' it raged very ſeverely if it was treated in a method different from this. But he ordered the bliſters every day, only 'till the violence of the diſeaſe abated; for afterwards he found that they were not neceſſary, and therefore he left the diſeaſe to take its own courſe, to burn out, or, as it were, deſtroy itſelf by its own force. But although in this comatous fever the forerunning ſigns of recovery were generally deferred to the thirtieth day, yet he found that there was no farther occaſion for evacuations after the fourteenth day, nor did he from that time order clyſters, or hardly any other medicines, unleſs the importunity of the patient's friends urged him to preſcribe ſome innocent julap. He only gave a very thin diet, and took care to let the patient ſit upright a few hours every day out of his bed; or if the patient's great weakneſs forbid this, he only ordered him to put on his cloaths, and to lie upon the bed, with his head raiſed pretty high. But almoſt the firſt ſign of the diſeaſe going off, was the patient's having a

ſtrong,

ſtrong, but abſurd deſire for improper food or drink, to which he uſually conſented, even though it did not ſeem convenient.

See alſo what has been ſaid in the cure of febrile weakneſs at § 670, where the ſame methods were recommended when the weakneſs aroſe from the ſame cauſe.

But great care ſhould be taken to prevent ſuch comatous patients from having a gangrene in thoſe parts, which are too long compreſſed by the weight of the body, lying a long time in the ſame poſture: which may be prevented if the poſture of the body is frequently changed, and the naked ſkin is covered with the ſofteſt leather.

SECT. DCCVI.

BUT thoſe remedies recommended for a delirium (§ 702.) are here alſo convenient; more eſpecially fomentations applied to the head and neck.

For ſince a coma ariſes almoſt from the ſame cauſes as a delirium; and as a delirium is often obſerved either to precede, accompany, or ſometimes follow after a febrile coma, it is evident that the remedies recommended for the cure of a delirium will be likewiſe uſeful for that of a coma, having always a regard to the known cauſes of the diſorder, with the epidemical nature of the fever, of which the coma is a ſymptom. But anodynes which are uſeful when given prudently, and at a due ſeaſon of the diſeaſe, for the cure of a delirium, are more ſeldom to be uſed in the preſent caſe, and they are hardly ever given, unleſs required by ſome other ſymptom. Thus Sydenham [c] con-

[c] Sect. V. pag. 290, 291.

condemns the uſe of them in that febrile coma, which he has deſcribed as epidemical. But yet when a dyſentery or diarrhœa accompanied this diſeaſe, as ſometimes happened, he gave narcotics to allay theſe new ſymptoms; namely, if they were ſo violent as to endanger the patient's health. But when a coma attended the diſeaſe from too great a velocity of the circulation, even then Sydenham endeavoured to allay the raging orgaſm or dſturbance of the ſpirits by anodynes; namely, in that ſecondary fever of the confluent ſmall-pox, which derives its origin from the putrid and almoſt gangrenous humours abſorbed; as we ſhall hereafter explain more at large in the hiſtory of the ſmall-pox.

SECT. DCCVII.

BUT if there are preſent the ſigns of a great inflammation, it is then to be treated as a primary or principal diſeaſe, according to the directions we ſhall hereafter give for a phrenzy.

For then the whole cure of the diſeaſe depends upon reſolving the inflammation; concerning which we ſhall treat hereafter under the title of a phrenzy.

Of

Of Wakefulneſs in FEVERS.

SECT. DCCVIII.

WAKEFULNESS or watching is a diſorder contrary to the former (§ 703) whence the nature of it may be underſtood: it has for its cauſe generally a ſlight beginning inflammation in the brain, which, gradually increaſing, is often changed into a coma.

When the organs of the internal and external ſenſes, and the inſtruments of the voluntary motions are ſo diſpoſed that they readily perform their uſual motions, and are eaſily affected by objects, then a healthy perſon is ſaid to be watchful or awake [d]. But although in diſeaſes the uſual motions are no longer exerciſed with eaſe, yet the organs of ſenſation are eaſily affected by external objects, or if the internal diſpoſition of the brain is ſuch, that thereby is made a ſort of continual irritation upon the common ſenſory, like that which is made by external objects through the ſenſitive organs; in that caſe watchfulneſs attends, which is a diſorder oppoſite to that of a coma, in which we obſerve a continual ſleepineſs.

But although watchfulneſs is obſerved to follow moſt certainly from pain, anguiſh, violent paſſions of the mind, cares, &c. yet watchings conſidered as a ſymptom in fevers, uſually proceed from another cauſe. Namely, when there is the beginning of a very ſlight inflammation ariſing in the brain,

[d] H. Boerhaave, Inſtitut. § 587.

from too ſwift motion of the humours thro' the veſſels of that part, from a greater determination of their impetus towards the head, or from an incipient impervioufneſs of the humours at the ſame time, whereby all the veſſels are ſo much diſtended that the brain may be very eaſily affected by external objects; or elſe ſuch an irritation is continually made in the common ſenſory from the ſame cauſe, that ſleep cannot ſteal upon the patient. For a certain determinate degree of fulneſs and tenſion is required in the veſſels of the encephalon, to enable it to carry on the exerciſes of the ſenſes and motions; and that from a greater degree of theſe a perſon muſt be wakeful, is evident from hence, that too great emptineſs of the veſſels is always followed with ſleepineſs, as we declared before at § 704. But this tenſion and repletion of the veſſels being a little increaſed, ſeems to be the cauſe of wakefulneſs in febrile patients; but the ſame being increaſed to a greater degree, ſeems to occaſion a coma or perpetual ſleepineſs, by a compreſſure of thoſe very tender and minute fibres of the encephalon, upon which the exerciſes of ſenſe and motion depend.

Thus we ſee that ſleep is prevented while the feet and lower parts of the body remain cold; becauſe the courſe of the humours is thereby too much increaſed towards the brain. Sleep is alſo prevented in many people by their drinking of warm watery liquors in an evening, becauſe the veſſels are thus more diſtended by increaſing the quantity of their contained fluids: but in drinking more plentifully of fermented liquors, as wine, ſtrong ale, &c. as theſe become more rarefied by the heat of the body, they cauſe a much greater diſtention of the veſſels, whence a very profound ſleep often enſues. Hence likewiſe in acute diſea-

ſes, when a ſalutary and critical hæmorrhage is about to happen from the noſe, watchings or wakefulneſs often go before; namely, becauſe the blood is carried towards the head more plentifully and with a greater force; and therefore at that time we uſually obſerve a pain of the head, tightneſs about the neck, redneſs of the eyes, &c. by which ſigns the truth of this aſſertion is confirmed; and therefore it is that Hippocrates [e] ranks wakefulneſs among the ſigns of a future hæmorrhage.

Since therefore febrile wakefulneſs generally owns for its cauſe a very ſlight inflammation in the cortical part of the brain, the diſorder may be eſteemed of no danger. But if we conſider, that if the ſame cauſe ſtill continues, or is increaſed, it may produce a coma, delirium and convulſions, it will be evident enough that our endeavours ought to be uſed to remove it immediately. For if this wakefulneſs continues long, it exhauſts the ſpirits, which can be repaired by no art but by ſleep; and when the moſt ſubtile parts of our humours are once diſſipated, the reſt are inſpiſſated; at the ſame time the ſmalleſt veſſels will be too much worn away for want of their alternate reſt, while the humours are in continual motion; hence the powers will be weakened, and conſequently many and very dangerous evils may from thence enſue. Therefore Hippocrates has juſtly condemned it as one of the worſt ſigns, if the patient can get no ſleep either in the day or night. See the place cited from him in the commentaries to § 605. N°. 12.

[e] Coac. Prænot. N°. 112, 113. Charter. Tom. VIII. pag. 858. & Prorrheticor. Lib. I. textu 137, 138, 139. ibid. pag. 794.

SECT. DCCIX.

FEBRILE wakefulneſs is cured by reſt of body; by peace or quietneſs of mind; by abſence of all ſenſible objects; by a moiſt and moderately cool air; by inſipid and emollient nouriſhment; by mealy, ſoft and emollient drinks; by a low, conſtant and agreeable humming, or whiſpering, or a ſoft ringing of ſome ſonorous body; by medicines farinaceous, oleaginous, moiſtening and ſoothing; by the exhalation or ſcent of ſoporiferous plants; by the uſe of medicines which are anodyne, paregoric, ſoporiferous or narcotic; obſerving always to premiſe firſt the uſe of ſuch remedies as are able to remove the inflammation, and abate its increaſe.

Two things are principally recommended to us in the cure of febrile wakefulneſs: the firſt is to remove the known cauſe of this diſorder, namely the incipient inflammation of the brain, by a juſt treatment; and this will be obtained by the uſe of ſuch means as dilute, attenuate, relax and make a revulſion of the force and quantity of the humours from the head, and which leſſen the too great quickneſs of the circulation: the other is to adminiſter thoſe things to the wakeful patient, which we know are able to procure ſleep in healthy people: for we may hope by theſe means to induce ſleep, tho' the cauſe of the wakefulneſs be not yet wholly removed; and therefore by theſe at leaſt we may avoid the ill effects to be feared from long continued watching, and in the mean time we need

not neglect thoſe remedies which are able to remove the cauſe itſelf of the wakefulneſs. But the principal means for this end are enumerated in the preſent aphoriſm.

By reſt of body and peace in mind.] How much theſe two are able to effect in the cure of diſeaſes which ariſe from an exceſs of the circulation, was declared before in the commentaries to § 104, and 105. But the firſt ſign of an agreeable ſleep creeping on, is a reſt or inactivity of the voluntary muſcles. For in a perſon about to ſleep, all the voluntary motion grows ſlower and weaker by degrees till they quite ceaſe, and the muſcles deſtined to the exerciſe of thoſe motions become flaccid, as if they were paralytic, and therefore it is evident that the reſt of the muſcles diſpoſes to ſleep. But ſleep above all things requires a peaceable tranquillity of the mind. For all violent paſſions, and more eſpecially diſtracting cares, are able to prevent ſleep, even in healthy people, tired with daily labour. Hence the poets have juſtly given the epithet, *Vigiles curas*, "Watchful to cares." And hence Celſus [f] rightly cautions: *Si qua ſunt, quæ exaſperatura eorum animos ſunt, optimum eſt ea, dum ægrotant, eorum notitiæ ſubtrahere: ſi id fieri non poteſt, ſuſtinere tamen poſt cibum, poſtque ſomni tempus, & cum experrecti ſunt, tum exponere.* "That if there "are any affairs which may diſturb the mind of a "patient, it is beſt to keep the knowledge of them "ſecret whilſt they lie ill: but if this cannot be al-"lowed, yet it may be deferred, and after the "patient is got up, refreſhed with ſleep and food, "the matter may be then made known."

By abſence of ſenſible objects.] Even a healthy perſon ſleeping is awaked by the action of objects violently affecting the external ſenſes, and ſo long as

[f] Lib. III. cap. 6. pag. 127.

as the ſenſes are ſtrongly affected all ſleep is uſually prevented. Hence when people incline to ſleep they ſpontaneouſly cloſe their eyelids, that the eyes may not be affected either by light, or ſenſible objects. And for this reaſon the ancient phyſicians order thoſe who are ill of acute diſeaſes to be laid in a dark apartment, remote from all noiſe. But it is evident theſe precautions are ſtill more neceſſary, when in a febrile wakefulneſs the organs of ſenſation are more ſtrongly affected by objects, occaſioned by the inflammatory tenſion of the brain. All theſe particulars are elegantly remarked by the poet [g], where he deſcribes the pleaſing retirement of ſleep.

Quo nunquam radiis oriens, mediuſve, cadenſve
Phœbus adire poteſt. Nebulæ caligine miſtæ
Exhalantur humo: dubiæque crepuſcula lucis.
Non vigil ales ibi criſtati cantibus oris
Evocat auroram: nec voce ſilentia rumpunt
Sollicitive canes, canibuſve ſagacior anſer.
Non fera, non pecudes, non moti flamine rami,
Humanæve ſonum reddunt convicia linguæ.
Muta quies habitat, &c.
Janua, quæ verſo ſtridorem cardine reddat,
Nulla domo tota; cuſtos in limine nullus.
At medio torus eſt, ebeno ſublimis in atra,
Plumeus, atricolor, pullo velamine tectus:
Quo cubat ipſe Deus, membris languore ſolutis.

By a moiſt and moderately cool air.] In violent ſummer-heats even healthy people can ſcarce ſleep well if they lie in a chamber that has been expoſed to the diurnal rays of the ſun. But ſince the heat of the body is greater in thoſe who have a fever, a hot air will be ſtill much more troubleſome

[g] Ovid. Metam. Lib. XI.

me to them. We see the night-time is naturally lotted to us to sleep; and then the air is always roportionably more cold and moist than in the ay. When people tired with travelling, or hard bour, endeavour to recruit their languishing rength by noon-sleep, they lie down under the ade of the broad beech-tree, or the tremulous oplar; for thus they are both guarded from the n's heat, and refreshed by the moist atmosphere xhaling from the leaves of the tree, while they njoy a quiet sleep. For this reason Ovid * places ne habitation of sleep in the cave of a mountain, hich is never illuminated by the sun's rays; and e adds clouds or vapours exhaling from the ground. ut in what manner, and by what means too great eat of the air may be corrected, and at the same me a moisture communicated to an air which is oo dry, was declared at large in the comment to 605, N°. 2.

By insipid, emollient nourishment, and by mea-, soft, and emollient drinks.] All those aliments nd drinks are here most convenient which may e prepared from barley, oats, rice, and the soft-st pot-herbs: for thus the acrimony of the hu-nours, which is often increased by the fever, may e soothed or lessened, and the dryness of the ody, which often hinders sleep, may be reme-ied; and at the same time too great violence f the fever is thus happily allayed (see § 610.) rom which last alone, obstinate watchfulness often rises. For since every thing is to be avoided which may strongly affect the organs of the external enses, in order to induce sleep, it must be evidently ecessary likewise to remove all those irritations within, which arise from acrimony of the humours, dry-

* Ovid. Met. Lib. XI.

dryneſs of the body, and imperviouſneſs or tenacity of the juices.

By a low, conſtant, and agreeable humming or whiſpering, or ſoft ringing, *&c.*] How ſerviceable ſuch a ſoft but equable murmuring may be was declared in the comment to § 702: and there appeared that ravings might be thus quieted and ſleep induced. Ovid * has very beautifully obſerved this; for though he places the habitation of ſleep in ſilent ſtilneſs, yet he adds,

——— *Saxo tamen exit ab imo*
Rivus aquæ Lethes: per quem cum murmure labens
Invitat ſomnos crepitantibus unda lapillis.

By medicines farinaceous, oleaginous, moiſtening and ſoothing.] Such as conſpire by their effects together with the aliments and drinks, before commended for ſuch patients. Emulſions prepared from almonds, ſeeds of cucumbers, melons, gourds, *&c.* with water grewel, or barley-water are here more eſpecially recommended. To theſe it is uſual to add the ſeeds of the white poppy, which have the ſame efficacy with the former, but have no narcotic virtue, as I am well aſſured, and therefore they may be ſafely uſed in great plenty. But all theſe are of uſe here, inaſmuch as they moiſten and ſooth by their mealy tenacity, and mitigate or ſheathe all acrimony by the ſweet oil with which they abound; and at the ſame time they afford the beſt nouriſhment. For all theſe ſeeds being bruiſed and preſſed, afford great plenty of oil, which yet for the moſt part ſoon turns rancid; and therefore the uſe of theſe oils ſeems to be leſs ſafe in fevers. But in emulſions prepared from the ſeeds, we have the ſame oily ſoftneſs without any dan-

* Ovid. Met. Lib. XI.

danger of a rancid acrimony, ſince theſe rather turn ſour. Here alſo are to be recommended decoctions of the lacteſcent plants, as of ſuccory, hawk-weed, dandelion, vipers-graſs, goats-beard, lettuce, *&c.* all which, upon wounding them, pour out a milky juice, that is of the greateſt efficacy for diſſolving the febrile viſcidity (ſee § 614;) and in almoſt all theſe there is a mild paregoric or eaſing virtue, not ſo much ſtupefying as that we obſerve in the poppy or the like narcotic plants, but ſuch as happily diſpoſes to natural reſt or ſleep. Ovid [h] ſeems likewiſe to have pointed out the uſe of theſe, when he ſays,

Ante fores antri fœcunda papavera florent,
Innumeræque herbæ, quarum de lacte ſoporem
Nox legit, & ſpargit per opacas humida terras.

But out of all theſe a great variety of medicines may be choſe, no leſs pleaſant than efficacious.

By the exhalation or ſcent of ſoporiferous plants.] The heads of flowering poppies bruiſed, henbane, common night-ſhade of the ſhops, bean-bloſſoms, *&c.* exhale ſuch a ſcent, which being a long time drawn through the noſtrils, makes the head dull, and brings on a ſlight ſleepineſs. With theſe may be ſpread the floor of the chamber in which the patient lies, or which is better, theſe flowering plants being pulled up by the roots may be placed in veſſels full of water to ſtand within the patient's chamber; thus their ſoporiferous ſmell will be diffuſed through the air, with the watery vapours which they exhale, ſo as to induce ſleep likewiſe by moderately cooling and moiſtening the air; in the winter-months the want of theſe plants may be

[h] Ovid. Met. Lib. XI.

be ſupplied by the officinal waters diſtilled fro
them in ſummer. For the ſame reaſons likewi
Aretæus [i] would have the like whole plants, bein
freſh gathered, to be put about the patient's neck
Craſſant enim & madefaciunt ſpiritum aridum & t
neum, & caliginem quandam ſenſibus obducunt: gra
ve autem & torpens eſt caligo: id vero eſt ſomn
principium. " For they thicken and moiſten th
" air which is too thin and dry, and draw a clou
" or miſt as it were over the ſenſes: there is like
" wiſe a heavy or dull miſt before the ſight; bu
" this is the beginning of a ſleep."

By the uſe of medicines which are anodyne, pa
regoric, *&c.*] But ſince febrile watchings ſeem
to ariſe generally from a beginning inflammation i
the brain (as we declared at § 708.) it will not b
ſo ſafe to have recourſe immediately to narcotics
and with them to ſtupify the patient. For as w
cautioned before in the comment to § 229, N°. 2
and in the cure of a delirium, § 702. the uſ
of narcotics is to be ſuſpected in acute inflamma
tory diſeaſes, before their violence is abated; an
Sydenham has obſerved that before the height wa
over, theſe medicines never were of ſervice, bu
often did miſchief. The cure of the inflammatio
muſt be therefore attempted by all the powers o
art, and the increaſe of it prevented: for whic
purpoſe will conduce chiefly bathings of the feet
with frictions of them, an erect poſture of th
body, with bliſters applied to the lower parts; by al
which means the violence of the diſeaſe is drawn
from the head. Aſclepiades [k] placed ſo great hope
in frictions, that from them only he expected ſleep
that was ſo neceſſary but difficult to be procured
in phrenetic patients. For he would have, *U*
prim

[i] Lib. I. de Curatione morbor. acut. cap. 1. pag. 75.
[k] Celſ. Lib. III. cap. 18. pag. 152.

primo die a cibo, potione, ſomno abſtineretur: veſperi daretur potui aqua: tum frictio admoveretur lenis, ita ut ne manum quidem, qui fricaret, vehementer imprimeret: poſtero deinde die, iiſdem omnibus factis, veſperi daretur ſorbitio & aqua, rurſuſque frictio adhiberetur. "The patient to abſtain 'the firſt day from food, drink, and ſleep; in 'the evening water may be given for drink, then 'gentle friction may be uſed, ſo as not to preſs 'the hands forcibly which rub the parts; upon 'the day following, all the ſame courſe being ta-'ken, in the evening may be given nouriſhing 'ſuppings and water, and again the friction is to 'be applied." But he believed this remedy ſo efficacious for procuring ſleep, that he confeſſes too much friction might be in danger of rendering the patient lethargic. But although in the place cited it is not determined what parts of the body are to be ſubject to the friction; and Aretæus[1] equally praiſes gentle ſtroking of the head as well as ſoft rubbing the feet with oil: and even adds, they will be eſpecially uſeful if the temples and ears are ſcratched, ſince the anger and fury of wild beaſts are more eſpecially quieted by a gentle rubbing of the head and ears; yet it ſeems preferable for making a revulſion of the humours from the head, to rub the feet; though likewiſe a ſoft ſtroking of the head ſeems to be not without its uſe. *Longe enim ſæpius aliud perfricandum eſt, cum aliud dolet; maxime neque cum a ſummis, aut a mediis partibus corporis evocare materiam volumus, ideoque extremas partes perfricamus.* "For it is much oftener neceſſary 'to rub a remote part, when another is in pain; 'and eſpecially when we would call off the of-'fending matter from the upper or middle parts 'of the body, we for that purpoſe rub the ex-

"tre-

[1] Lib. de Curat. morb. acut. cap. 1. pag. 75.

" tremities [m]." It will be likewiſe one of the beſt remedies to apply at the ſame time linen cloths dipped in vinegar and water, to the forehead. Even Sydenham [n] obſerves, that if the watchfulneſs outlaſts the fever, and the other ſymptoms are gone off, linen-cloths wetted in roſe-water, and applied cold to the forehead and temples, prove of more uſe than any kind of narcotics. But if the wakefulneſs ſtill continues after all theſe means have been tried, and the diſeaſe is now in its declenſion, the ſigns teaching that there is no longer any reaſon to fear from an inflammation in the brain; then anodynes, paregorics and narcotics may be uſed, beginning with the mildeſt, and gradually augmenting their doſe, or changing them for ſtronger, until the diſorder is relieved.

[m] Celſ. Lib. II. cap. 14. pag. 90.
[n] Sect. I. cap. 4. pag. 83.

Of

Of Convulsions in FEVERS.

SECT. DCCX.

Convulsions before described (§ 230 to 235.) do here always proceed from a isorder of the brain within, or from without, by things vellicating the brain by the erves (as § 627, 631, 632, 633, 642, 648, 49, 652, 653, 654.); or else from an inordinate afflux, reflux, or a waste of the fluid f the brain, which may arise from all those auses that are able to produce a delirium, oma, or wakefulness (§ 701, 702, 703, 04, 708.); and therefore there is here again great variety observed, as well in the causes s in the methods of cure.

What a convulsion is, with its several kinds, nd how it may be distinguished from a tremor, as declared before, when we treated of this mptom in the history of wounds, namely, from 230 to 235. We then assigned the general cause convulsions to be every thing that drives the ervous liquid with an alternate force into the mus-es. But there we only considered this disorder as r as it might arise from causes seated in the ound itself, and which arose principally from me matter irritating the naked nerves in the ound; or from such a lacerating tension of the erves as arose from a division of some of their bres, whereby those remaining whole sustain all e force of those divided; or lastly, so far as

this symptom might follow from too great a loss of blood preceding. But since convulsions sometimes attend in fevers, and then often arise from other particular causes, they therefore deserve a particular consideration among the other symptoms in fevers.

But since the actions of all the voluntary muscles depend on the brain, and it is almost in these muscles only that convulsions are observed (for febrile convulsions seem hardly to take place in injuries of the vital actions) and as these receive their action from the brain, it is evident a convulsion ought to be ascribed to a disorder of the brain, for that the cause producing contraction in the muscles is derived into them from the brain, by the nerves. The immediate cause therefore of convulsions always resides in the brain, though the remote causes may be placed in other very different parts of the body, as will immediately appear. Even in wounds the remote causes are always there seated, or at least they arise from the wound, as the productive cause: but febrile convulsions, though they may likewise arise from remote causes seated in other parts of the body, yet may they also proceed from a topical disorder of the brain. But since convulsions may take place in all muscles, and it appears that there are muscular fibres in the lungs, stomach, intestines, bladder, &c. it is therefore evident that these viscera may be affected with the like disorder: but, properly speaking, these last do not here concern us, since such disorders are discoverable almost only by the injured functions of those viscera, but are not always obvious to the outward senses of the physician. For we have seen before that dreadful anguish arises from a convulsive contraction of the fibres in the lungs, a nausea and vomiting from a like disorder of the muscular fibres in the fauces,

œsophagus, stomach, intestines, &c. and the same likewise appeared when we treated of belchings and flatus. Moreover, the actions of these muscular fibres are performed without any determination from the will, and continue while all the actions of the brain are silent, in a profound sleep, or in an apoplexy. Therefore febrile convulsions, of which we are here treating, take place only in those muscles destined to move the body which are under the influence of the will; and consequently they always depend on a disorder of the brain. But it is evident, from what was said in the comment to § 701, that the common sensory may be affected by other parts of the body disordered, in the same manner as if the physical or productive cause had pre-existed in the brain itself; when at the same time the cause of the disorder is lodged in very distant parts, and it thence appears that this alteration of the brain is induced by means of the nerves. Hence we distinguish two sorts of causes of convulsions in fevers; namely, such as act upon the brain by first affecting the nerves in another part; and those causes which act immediately upon the brain itself, without first affecting the nerves in other parts of the body. But it appears from what was said in the history of wounds (see § 163, 164, 165.) that the brain may be so affected as to occasion the most violent convulsions, only by an injury of the nerves, or nervous parts, placed very remote from the head. It was likewise proved from the observations of Wepfer (see the comment to § 229, N°. 2.) that poisons lodged in the stomach produce the most dreadful convulsions, which cease immediately when those poisons are expelled by vomit. Hence it appears that febrile convulsions, as well as a delirium and coma, may arise from foul humours lodged about the præcordia.

Thus Galen[o] has observed some people suddenly seized with convulsions, without any previous sign that might presage them; but a bilious vomiting supervening immediately relieved them.

But all those causes which disturb the actions of the brain by exciting an inordinate afflux, reflux, or waste of the spirits, may likewise produce convulsions; as is evident from what was said concerning a delirium and coma, arising from the like causes. Thus we very frequently observe convulsions in children when the humours are agitated with a violent fever, and even in a vernal tertian, the most salutary of all fevers (except an ephemera), convulsions sometimes happen in the fits, only from the more violent motion of the humours through the brain; sometimes also a convulsion happens in the very first approach or coming on of such fit, when the quick, small, and often intermitting pulse sufficiently denotes the circulation to be disturbed (see § 576) and consequently that there is an inordinate impulse of the blood to the brain. Convulsions also are produced when the most tender vessels of the brain are compressed, either from a plethora or rarefaction, when the larger vessels are distended with too great a quantity of blood: Hence Hippocrates[p] gives us the following presage, *Caput dolentes, cum catoche delirantes, intercepta alvo, torvi oculis, facie florida* (ἀνθηροὶ) *opisthotono corripiuntur.* "Those who having a pain "in the head, are stupidly delirious, with costive- "ness of the bowels, a fierceness of the eyes, and "a redness of the face, will be soon taken with "(an opisthotonos) convulsions of the body back- "wards." But almost every one of these signs demonstrate too great a fulness and distension of the

[o] De locis affectis Lib. V. pag. 6. Charter. Tom. VII. pag. 493. [p] Prorrhet. Lib. I. Charter. Tom. VIII. pag. 756.

he blood-veſſels in the head. But alſo too great mptineſs of the veſſels may produce convulſions, whether the inanition ariſes from an hæmorrhage § 232.) or from any other evacuation of the humours. For then the neceſſary preſſure of the blood s wanting into the veſſels of the brain. Hence Hippocrates lays it down as a general axiom, hat convulſions ariſe either from repletion or inition.

It is therefore evident that febrile convulions ariſe from the ſame cauſes as a coma, delirium and wakefulneſs: And it alſo appears at the ame time that there is a great variety of theſe auſes; and yet that they ought to be accurately known and diſtinguiſhed, in order to determine ny thing certain as to the prognoſis and curative ndication, ſince the cauſes producing convulſions re often oppoſite, and require a contrary treatment or cure.

But convulſions we know are to be feared in evers, if any of the fore-mentioned cauſes have one before; and more eſpecially if a delirium, coma, or wakefulneſs, among other ſigns, denote hat the functions of the brain are diſturbed. A ubſultus or trembling of the tendons, when the hyſician examines the patient's pulſe, is deſervedly eſteemed a ſign of convulſions at hand. But when convulſions are once preſent, they are eaſily known nd perceived by every body.

SECT. DCCXI.

IF convulsions continue long, they by the consent or communication of the nerves, easily affect or spread into the whole nervous system, whence the most lamentable maladies ensue.

Altho' convulsions are always to be feared, yet when they cease immediately, they seldom leave much mischief behind. There are but few people in the world who have not at some time or other been troubled with convulsions, more especially in their infancy; in which stage of life convulsions usually arise from pain, a great noise, too strong a light, or other causes of the like kind, which violently affect the external senses. And even in adults, who by sad dreams are awaked out of their sleep, there is a sort of convulsion takes them thro' the whole body, in the instant, betwixt sleeping and awaking, especially when they imagine themselves thrown from a precipice, or have the like terrifying idea raised in the mind. It likewise appears from the observations of Galen, mentioned under the preceding section, that a bilious vomiting has instantly relieved people who were convulsed in fevers; and the like cases frequently occur in our daily visits to the sick. Hence we are told by the Coan prognostics[r]: *Convulsio in febre nata, eodem die desinens, bonum.* "That a "convulsion arising in a fever, and ceasing the "same day, is a good sign." But on the other hand, *Convulsio in febre nata sedat febrim eodem die, aut*

[r] Nº. 157, 158, Charter. Tom. VIII. pag. 860.

aut poſtero, aut tertio. Si vero tempus, in quo incipit, tranſgrediatur, & non deſinat, malum eſt. "That a convulſion ariſing in a fever, terminates "the fever on the ſame day, or on the ſecond or "third. But if the convulſion continues longer "than the firſt ſtage, in which is the beginning of "the fever, and does not terminate the ſame, 'tis "a bad ſign." For when a convulſion continues long, it may ſo diſturb the common ſenſory as wonderfully to change or pervert all its actions, and excite the moſt dreadful conſequences. But altho' the whole body is ſometimes convulſed at one and the ſame time in fevers, yet it oftener happens that the convulſions ſhew themſelves at firſt only in this or that ſingle part of the body; as when there is a ſubſultus of the tendons in the hands, or the face is drawn out of its proper ſhape, and the eyes are wonderfully diſtorted, or elſe rendered fixed or rigid and immoveable from a tetanos of the muſcles moving the eyes. After theſe appearances have continued ſome time, other parts are uſually affected likewiſe, and at length the whole body is miſerably convulſed; the whole nervous ſyſtem being then affected by the conſent of the nerves, as it is commonly called. For it appears from the moſt certain obſervations, that the nerves have ſuch a communication or conſent, that one being affected the reſt are diſturbed (as we ſaid before in the comment to § 701.) But as far as we are acquainted with the nerves from anatomy, they ſeem all of them to run thro' their courſe ſeparate from each other from the beginning to the end of them; the ſmaller nerves not being derived from the larger, as branches from their trunks, as we ſee in the arteries and veins in which the cavities of the branches communicate with thoſe of the trunks. For the larger

nerves, which resemble trunks, are made up of bundles of smaller nerves wrapped together in one common membrane; and these bundles are again made up of others still smaller, insomuch that the industry of the most minute anatomists has not yet been able to discover the end of their composition in this manner. But this fabric seemed to be necessary, that the most subtle fluid, secreted by the encephalon, and moved through the nerves, might pass through very distinct passages to every point of the whole body for the performance of sense and motion. Therefore this commerce or consent of the nerves seems to be performed by means of the encephalon, from whence each derives its origin distinct from all others. But when one part therefore has been first convulsed, we see afterwards that another is affected in the like manner, as the cause which produced the first disorder is propagated into other parts of the common sensory; namely, if the topical cause in the brain exciting convulsions shall be an inordinate afflux, transflux, and efflux of the nervous fluid. Or if the nerves being first irritated in some certain part of the body, without any topical disorder lodged in the brain, produce the like convulsions, we then know the cause is so powerful as to disturb the whole common sensory and its functions, upon which all the voluntary motions depend.

But how great and deplorable disorders may follow convulsions, if they continue a long time, was said in the comment to § 233. where we treated of the effects of convulsions. For so great is the severity sometimes of this lamentable disorder, as Aretæus observes[s], *Ut Medicus præsens atque aspiciens, nec ad vitam, nec ad doloris levamen, neque ad*

[s] Aretæi Cappad. de caus. & sign. morb. acut. Lib. I. cap. 6. in fine. pag. 4, 5.

ad figuræ emendationem quidquam opis adferre possit. Nam si membra dirigere velit, viventem sane hominem distraxerit discerpseritque: igitur victis a morbo nihil ultra subveniens contristatur duntaxat. Hæc vero est Medici magna infelicitas. "That the "physician who is present, and looks on, can do "nothing that will afford any relief either to the "patient's life, to ease the pain, or to correct the "figure of the parts. For if he would restore the "limbs to their proper positions, he must in effect "pull and tear the person to pieces while living; "and therefore the disorder being insuperable, he "can do nothing more than lament the patient's "misfortune. But this is a great unhappiness to "the physician."

SECT. DCCXII.

BUT if convulsions follow after the signs of an inflammation in the brain have preceded, they are commonly fatal: if the urine becomes watery and pellucid, after it has been first discharged thick, convulsions then following, are a very bad sign: if convulsions arise in a fever after large evacuations, they are commonly fatal, as also when they happen with a perpetual delirium.

But although convulsions are always dangerous, on account of the very bad effects which may from thence follow, yet are they still more dangerous in fevers. For, as Hippocrates[t] tells us: *Febrem enim convulsioni succedere præstat, quam febri convulsionem.*

[t] Hippocrat. Aphorism. 26. Sect. II. Charter. Tom. IX. pag. 68.

vulsionem. "It is better for a fever to follow af-
"ter convulsions, than convulsions after a fever."
But the different degree of danger is judged of chiefly from the difference of the known cause, with the age of the patient, and violence or continuance of the convulsions. For there are much greater hopes of a cure, when the brain is affected, for example, from corrupt bile lodged about the præcordia, than if the convulsions proceeded from a topical cause in the brain itself. Convulsions arising from too great fulness are much more easily cured than those which follow after great inanition; since we may be sooner able to remove by art that which abounds, than restore that which is lost. But the different age of the patient likewise makes a considerable difference with respect to the prognosis. For convulsions in infants or children frequently arise from slight causes, but in adults they seldom happen but from violent causes. Hence Hippocrates[u] says: *Pueris vero convulsiones fiunt, si febris acuta fuerit, & venter non dejiciat, & vigilent, & perterreantur, & ejulent, & colorem immutent, & ex viridi pallidum, aut lividum, aut rubrum induant. Hæc autem promptissime accidunt puerulis recens natis ad septem annos usque. Adultiores autem pueri, & viri, in febribus jam non prehenduntur convulsionibus, nisi vehementissimorum & pessimorum signorum quid accesserit, qualia in phrenitide fiunt.* "That children are convulsed
"if they have an acute fever, do not empty their
"bowels, but are wakeful, terrified, cross, and
"change their colour to a pale, green, livid, or
"red. But these accidents happen chiefly to
"children from the time of their birth 'till they
"are seven years of age. But more adult chil-
"dren

[u] In Prognosticis, Charter. Tom. VIII. pag. 683. Et in Coac. Prænot. N°. 356, 357. ibid. pag. 871.

" dren and men are not invaded with convulsions " in fevers, unless the most violent and malignant " symptoms attend, such as happen in a phrensy. But children are thus more liable to convulsions from their whole nervous system being more easily irritable, whence also in adults, especially women who have a like disposition of the nerves, convulsions may arise from slight causes, as Aretæus * observes. Perhaps for this reason Hippocrates, in the text lately cited, makes no mention of women, but only says, that more adult children and men are more rarely convulsed in fevers; but in another place he says [w], *Hystericis convulsiones faciles esse:* verum & addidit, *sine febre*; " that hysteri- " cal women are easily subject to convulsions, but " without a fever:" for there is certainly more danger if such women are convulsed, if they are afflicted with a fever; but in the mean time it is evident that in such women convulsions are to be expected even from slighter causes. But it is evident enough that as the convulsions are more violent they must be more dangerous. But the continuance of this disorder does not always afford the same prognosis; for although at first view it would seem that so much the worse of the event is to be expected, as the cause of the convulsion continues longer acting upon the brain, yet if the disorder runs to a great length, it is a sign that the strength of the body is capable of bearing such violent shocks; and there are some hopes left that nature may triumph over the disease, more especially if there are no signs denoting that the brain is daily more and more injured in its functions: which we know if a delirium, coma, watchfulness, insensibility,

* De causis & signis morb. acut. Lib. I. cap. 6 pag. 3.

[w] In Prorrhetic. Lib. I. text. 121. Charter. Tom. VIII. pag. 785.

lity, &c. often attending the convulsions are not increased, but rather diminished; and if at the same time the vital powers appear well conditioned, which we know more especially from the pulse and respiration. It may be asked, whether or no Sydenham did not conceive hopes of the patient's recovery in a symptomatic phrenzy attending in an acute continual fever, if after reducing the violence of the fever to its due moderation, this symptom continued any considerable time? for he plainly observes, that although this long continuance of so dreadful a symptom might terrify the by-standers, yet it did not infer speedy death, but that the patient has been either accustomed to the attacks of this symptom, or else able to support them, provided the violence of the fever is not kindled by the use of cordials and heating medicines[x]. It therefore seems very probable that in convulsions which arise from the like cause with a febrile delirium, such truces may sometimes take place; and I well remember to have met with several cases in my own practice, which confirm the same thing. In a noble youth, lying ill of an acute continual fever, there was a subsultus of the tendons appeared on the sixth day of the disease, followed with a trembling of the whole body; on the fourteenth day all the muscles of the body were convulsed, but the patient supported these dreadful symptoms to the twenty-first day, when the convulsions ceased, and the patient escaped from so dangerous a disease, though all his friends had given him over, and were very angry with me for entertaining as yet some hopes of his recovery, judging that I was troublesome to the patient by ordering medicines, when they were strongly persuaded that he must perish in a little time. For, unless a faithful servant

[x] Sydenham. Sect. I. cap. 4. pag. 81, 82.

vant had ſtrictly executed what I ordered, the patient might have periſhed by the cruel commiſeration of his friends. There are ſome paſſages in Hippocrates which confirm the ſame thing. For in deſcribing the epidemical conſtitution of a fever he ſays[y]: *Multis autem convulſiones, ac magis pueris ab initio: atque febricitabant, febribuſque convulſiones ſuccedebant; erantque hæc plurimis horum diuturniora quidem, ſed innoxia, niſi his, qui ex omnibus aliis pernicioſe haberent.* "Many were taken "with convulſions, and more eſpecially children, "even at the beginning; but in ſome the con- "vulſions followed after the fever; and theſe laſt "were indeed of long continuance in many, but "not fatal, except in thoſe who had above all "others the ſymptoms more eſpecially malignant." Even in a tetanos there are ſtill ſome hopes remaining, as appears from Hippocrates, where he ſays[z]: *Qui tetano corripiuntur, intra quatuor dies intereunt; hos vero ſi effugerint, ſani fiunt.* "Thoſe "who are taken with a tetanos expire within four "days; but if they ſurvive that ſpace, they reco- "ver." And in another place[a] he aſcribes ſtill a longer duration to this dreadful diſeaſe, when he ſays: *Hic tertio, aut quinto, aut ſeptimo, aut decimo quarto morbi die perit; hos ſi effugerit, convaleſcit.* "In this caſe the patient expires on the "third, fifth, ſeventh, or fourteenth day of the "diſeaſe; but if he eſcapes that time, he reco- "vers." Almoſt the ſame he affirms of an opiſthotonos, the continuance of which he makes ſtill much longer[b]: *Hic vero morbus, ut longiſſimè, ad dies*

[y] Epidem. I. text. 24. Charter. Tom. IX. pag. 46.
[z] Aphor. 6. Sect. V. Charter. Tom. IX. pag. 197.
[a] De Morbis, Lib. III. cap. 12. Charter. Tom. VII. pag. 587.
[b] De Internis affect. cap. 55. Charter. Tom. VII. pag. 678.

dies quadraginta detinet; *quos si effugerit, convalescit*. "For this disease holds the patient the longest "of all, even for forty days, which, if he escapes, "he recovers." But how dreadful these convulsions are appears from the description which Hippocrates gives of them in the places before cited; as also from what has been said of them by Aretæus [c].

It is therefore evident that there is always great danger in febrile convulsions, and yet that one ought not readily to despair. From what has been hitherto said we may be able to understand the following prognostic rules.

If convulsions follow after the signs of an inflammation in the brain have preceded, they are commonly fatal.] For it then denotes that the inflammatory cause is so violent, and so deeply situated in the narrow extremities of the vessels of the brain, that the medulla itself is affected. For as it appeared when we treated of wounds in the head, the meninges of the brain, and often the cortical substance itself are injured without any convulsions following; but when the medullary substance is injured, then convulsions immediately ensue. For all the hopes of a cure in inflammations of the brain consist in procuring a mild resolution of the inflammatory concrete, so as to restore it to a state of fluidity: but it was demonstrated among other things, at § 386, that the resolving an inflammation requires the obstructing matter to be not over compact, and the obstruction itself to be but small, especially in the arteries, or beginning of the lymphatic vessels. But when convulsions follow after inflammatory diseases of the brain, we know that the inflammatory concrete is impacted into the narrow extremities of the vessels in the cortex, and that therefore a resolution can hardly be expected: and the difficulty

[c] De causis & sign. morb. acut. Lib. I. cap. 6. pag. 3, 4.

culty of procuring such a resolution will be here still greater, because here the arteries, being destitute of their elastic coats, are more easily distended; and if the impetus of the humours urging behind the obstructions is diminished, they will not be able to repel back the impervious particles from the narrower towards the larger capacity of the vessels, and from thence into the trunks; upon which repulsion of the obstructing matter however the resolution of an inflammation greatly depends. Hence Aetius [d], in treating of febrile convulsions, says: *Fit autem & convulsio ob excedentem siccitatem: sequitur autem maxime pernicioſas phrenitides, tum propter febris vehementiam, tum ob intentos & agreſtiores motus. Et ex his, qui sic convulsi sunt, neminem servatum ipse vidi, neque audivi, qui vidisset.* "But convulsions arise from too great dry-"ness; but more especially they follow after very "bad phrenzies, as well from the violence of the "fever as the intense motion of the humours and "their wandering passage through the vessels. And "among those who are thus convulsed I have not "seen nor heard of any who have escaped." But the signs of an inflammation in the brain may be known from those of an inflammation in general, described at § 382, as also from what we shall say hereafter (§ 772) concerning a phrenzy.

If the urine becomes watery and pellucid after it has been first discharged thick, convulsions then following afford a very bad sign.] By the urine we know the salts and oils of the blood are evacuated from the body, which being rendered acrimonious would be injurious if they were any longer retained in the habit. But we observed before (§ 100) that an increased velocity of the blood's circula-

[d] Lib. Medicin. Lib. V. cap. 131. pag. 97. Vel tetrabibl. 2. serm. prim. cap. 131. pag. 286.

culation dissolved and rendered its salts and oils more volatile and acrid. It is therefore evident, that in fevers there is still a greater necessity for evacuating these acrid parts by urine; and therefore we observe the urine more acrid in fevers, higher coloured, and often discharged thick and full of contents from the greater attrition of the fluids and vessels against each other, and from the increased acrimony of the humours. If therefore after a thick urine first evacuated, it is soon after discharged watery and pellucid, we know that the salts and oils of the blood rendered more acrid are retained in the body, and mixing with the circulating humours, they offer the greatest injury to those parts, where the vessels are the most tender, that is in the encephalon. When therefore convulsions follow after such urine, we know that the brain is irritated by the retained acrimony; and therefore that there is the greatest danger, lest these very tender and pulp-like vessels should be in a short time dissolved by the more acrid humours, drove through them with an increased force of the circulation by the fever. Hippocrates [e] therefore justly condemns pale and thin urine as very bad, and assures us that the urine commonly has this appearance in phrenetic patients [f]: And Galen adds in his commentaries to this aphorism [g], that he never knew a phrenetic patient cured, who discharged such urine. But in another place Galen [h] says, that if the urine appears thin and pale in an ardent fever, it denotes a phrenzy; but if a phrenzy is already present, the urine having such an appearance presages death. Perhaps the urine is thus discharged

[e] In Prognostic. Charter. Tom. VIII. pag. 633, 635.
[f] Aphor. 72. Sect. IV. Charter. Tom. IX. pag. 182.
[g] Ibidem. [h] In libro de urinis Galeno adscripto, cap. 4. Charter. Tom. VIII. pag. 338.

charged becauſe the diſeaſe begins to injure the functions of the brain, whence the whole nervous ſyſtem is diſturbed: For we ſee in hyſterical and hypochondriacal patients, when the fit is upon them, they diſcharge an incredible quantity of a thin pellucid urine; and therefore ſuch urine ſeems to be a very bad ſign, and of pernicious conſequence, inaſmuch as the offending acrimony is then retained in the habit.

If convulſions ariſe in a fever after large evacuations, they are commonly fatal.] For even death itſelf is at hand when convulſions proceed from this cauſe; as we ſee in the ſlaying of animals, which are violently convulſed a few minutes before death. Moreover, the cure of convulſions, ariſing from profuſe evacuations, requires an immediate reſtitution of the loſt humours, which is extremely difficult, if not impracticable in febrile patients. For although ſuch exhauſted patients take in the beſt nouriſhment of any kind; yet it is neceſſary for the action of the veſſels and viſcera to change the ſame into the nature of our healthy humours: But ſince in fevers all or moſt of the functions recede ſo much from their healthy condition, the reaſon of this difficulty is evident. See alſo what has been ſaid in the comment to § 234, N°. 4.

As alſo when they happen with a perpetual delirium.] Although the exerciſe of the voluntary motions of the muſcles depends on the brain, and the ideas ariſing from objects acting upon the external ſenſes, or from the imagination together with the combination of thoſe ideas and the judgment ſucceeding riſing, and the paſſions of the mind are all of them likewiſe ſeated in the brain; yet it appears from obſervations, that diſtinct actions are exerciſed in different parts of the brain. For ſometimes in fevers the brain being affected there is a

delirium, though the exercise of the muscular motions remains uninjured: And sometimes again convulsions are observed in fevers without any delirium, though more rarely. For commonly a delirium attends at the same time, or at least precedes convulsions. If the delirium is slight and appears at intervals, the injury is less; but when convulsions are accompanied with a perpetual delirium, we know that all the functions of the brain are disturbed, and consequently that there is the greatest danger.

Yet the antient physicians seem to have observed the most violent convulsions without a delirium. For in the history of a tetanos, which is so exactly described by Aretæus [i], there is no mention made of a delirium; nor is it mentioned by Hippocrates [k]. But where he describes an opisthotonos, he adds that sometimes these patients trifle. I have likewise myself had an opportunity of seeing a tetanos without any delirium through the whole course of the disease; but as this kind of disorder rarely happens in these countries, unless it happens to proceed from an injury of the nerves or tendons, I judged it would be of use to add here what I had observed in this wonderful disorder. A healthy virgin of a good habit, about thirty years old, rising up in a morning, observed the left side of her face swell, the upper eye-lid of the left eye depressed, and the corner of the mouth of the same side drawn upward. But finding herself very well in other respects, and having been frequently troubled with a like swelling of the face with the tooth-ach from carious teeth, she suspected nothing amiss

[i] De causis & signis morbor. acut. Lib. I. cap. 6. pag. 3. & 4.
[k] De morbis, Lib. III. cap. 12. Charter. Tom. VII. pag. 587. De intern. affection. cap. 56. ibid. pag. 678.

amiſs, but for three days followed her uſual labour, walking daily through the ſtreets. On the fourth day ſhe conſulted me, and by an accurate enquiry I was not able to diſcover any remote cauſe of the complaint, though I ſuſpected ſomething malignant lay concealed. After a conſiderable quantity of blood taken from a vein, I ordered a cooling purge, by which means the ſwelling of the face with a retraction of the lip began to abate, and the upper eye-lid was more elevated. But on the ſixth day ſhe was taken with a fever, and at the ſame time began to perceive an unuſual ſtiffneſs in the neck, and it was with difficulty that her jaws could be opened. After another bleeding I ordered the jaws, neck, and throat to be covered with an emollient plaſter, endeavouring at the ſame time to fill the body with ſoftening decoctions. On the ſeventh day the jaws were very ſtrictly cloſed together, and on the eighth day the whole back was ſtiff, together with the neck, even down to the os ſacrum, and ſhe perceived an approaching tetanos was threatened in her hands and feet; the face appeared turgid and inflated, and the fever continued the ſame. On the eleventh day the deltoide muſcles in each arm were ſwelled and extremely rigid, and ſhe complained of perceiving a wonderful motion in the abdomen, which upon the leaſt ſpeaking aſcended to the ſtomach: In this ſhe perceived ſome relief from a moderate compreſſure of the abdomen; when ſhe ſlept, her hands were convulſed, and her eyes rolled about in a wonderful manner. On the twelfth day of the diſeaſe all the limbs were ſtiff: On the thirteenth day the tenſion in the nape of her neck began to diminiſh, and, upon beginning to ſleep ſhe would wake ſuddenly in a fright, perceiving a ſort of an impediment or uneaſineſs in her throat, with a difficulty of ſwal-

lowing. On the fourteenth day ſhebegan to mov
her arms and neck, her ſwallowing became eaſie
and when ſhe ſlept her jaws opened from eac
other, but were contracted again as ſoon as ſh
waked. On the ſixteenth day ſhe perceived
wonderful ſort of motion in the abdomen wi
great anguiſh, but without pain: but in each gro
ſhe felt a moſt troubleſome tearing pain; th
whole trunk of the body was rigid with the tet
nos, but ſhe was better able to move her legs, an
could a little open her jaws, ſo that I could pe
ceive her tongue beſet with painful white ſpot
Almoſt in the ſame condition ſhe continued till th
nineteenth day, and then the fever began to i
creaſe, the pulſe became fuller, and the ſkin w
all over moiſtened with a moderate ſweat: Sh
was now better able to move her limbs, and cou
open her mouth wider; but the trunk of her bo
continued ſo ſtiff, that when ſhe would ſit upright
bed, ſhe was obliged to be raiſed by the repeated e
forts of two women, ſo as to bend her body forwa
with a conſiderable force, which yet was affect
with no pain, notwithſtanding the great force uſe
her appetite increaſed, but ſhe could as yet only ta
liquid food, becauſe maſtication was uneaſy. B
her eyes rolled about, and her face was diſtort
during ſleep. On the twentieth day there w
an itching attended all over the body, and a ki
of lacerating pain was felt in each of the groi
On the twenty-firſt day the fever abated, and eve
thing ſeemed to be upon the improving hand. O
the twenty-ſecond day there was a troubleſom
pain about the upper orifice in the ſtomach, as a
in the back at about the ſame height. On t
twenty-third day there was again a difficulty
opening the jaws, ſhe perceived a ſtiffneſs only
the right ſide of the ſpine, and the pain about t
upp

pper orifice of the ſtomach diſappeared. On
ne twenty-fourth day there was a pain extended
om the loins to the right ſhoulder, which was
lieved by compreſſing the abdomen. The fever
the mean time gradually decreaſed; as did alſo
ne ſtiffneſs on the right ſide of the ſpine, but a
iſagreeable numbneſs was perceived in the ſame
lace, which alſo leſſened by degrees. On the
wenty-ninth day the fever was quite off, the pa-
ent had a good appetite, could open her jaws,
nd put out her tongue, which laſt appeared ſwel-
d, and in a manner ulcerated upon one ſide. At
ne ſame time ſhe had alſo a ſenſation, as if a great
umber of ſtrings were broke aſunder in her back,
ut without any pain: about the fortieth day from
ne beginning of the diſeaſe, ſhe was able to go up
nd down ſtairs, and was afterwards perfectly re-
ored from ſo difficult a diſeaſe, and has now lived
hree years ſince in perfect health.

But through the whole courſe of the diſeaſe ſhe
ontinued perfectly in her right mind, and the urine
very day depoſited a quantity of a pretty uniform
ediment. But after two bleedings, when I found
he fever ſo moderate that there was no danger
om its too great violence, I ſupported the pati-
nt's ſtrength by a mild diet, diverting the impe-
us of the humours from the head by the applica-
on of epiſpaſtics to the feet: I two or three
imes excited ſtools by emollient clyſters, when
he bowels were conſtipated; I fomented the rigid
nd cramped parts with the moſt emollient lini-
ents, giving internally at the ſame time the moſt
mollient decoctions and emulſions, with the addi-
ion ſometimes of gentle nervous medicines; and
owards the end of the diſeaſe, when the watch-
ngs proved troubleſome, I procured ſleep by gen-
le anodynes. One great advantage was, that du-

ring the whole time in which the jaws were obsti
nately contracted, we had an opportunity of con
veying drink and liquid food through several inte
stices here and there made by decayed teeth.

SECT. DCCXIII.

IN the cure of febrile convulsions, the
particular cause is first to be discovere
(§ 710.) with the part originally affecte
from whence the convulsion arises (§ 710
and then, without delay, such medicines a
to be applied, as are capable of obtundin
acrimony, or resolving impacted matter, an
of relaxing contracted parts. Therefore the
convulsions are usually cured by diluting, re
laxing, and softening medicines, with revulsi
ons; nor ought any confidence to be place
in such medicines as are endowed with th
pompous title of nervous or antispastic, f
the cure of convulsions.

Since it is evident from what was said at § 71
that febrile convulsions have been observed fro
very different, and even opposite causes, it will
necessary to discover them by a careful enquiry,
order to make a successful cure. For convulsio
may arise from too great fulness, as well as fro
too great emptiness of the vessels; and therefo
what may be proper for the cure in one place, m
often destroy the patient in the other case.
the same time also it is necessary for the physici
to be acquainted with the part originally affecte
namely, whether the topical cause is lodged
the brain itself, or whether such things are prese

in other parts of the body as affect the brain by irritating the nerves; for in ſuch a caſe it would be in vain to apply medicines to the head. When, for example, a great quantity of bile fluctuates about the præcordia, and diſturbs the actions of the brain, a vomit given ſoon removes that cauſe of convulſions in fevers: but when the ſame ſymptom ariſes from impervious blood urged into the cortical ſubſtance of the brain, a vomit given in that caſe would increaſe the diſorder, ſince we plainly ſee, that in vomiting the blood is urged with a greater impetus to the head. But the ſigns have been already given, by which the various cauſes of convulſions may be diſtinguiſhed, and the part diſcovered in which the origin of the diſorder is ſeated. This being known, and not before, the medicines are next to be thought of, in which therefore there is a great diverſity required, according to the variety of the cauſes and the parts affected. But in general we may conclude that ſuch things may be uſeful as are capable of obtunding acrimony, of reſolving impacted matter, and of relaxing contracted parts. For except in that kind of convulſions which ariſes from a ſudden and great emptineſs of the veſſels, and which can only be relieved by ſuch things as repleniſh the veſſels, theſe remedies always take place; yet having a regard to the particular kind of acrimony, and the nature of the obſtructing matter impacted into the narrow extremities of the veſſels. For thus in young children living almoſt entirely upon milk, the cheeſe-like coagulum lodged in the ſtomach and inteſtines, and degenerating into an acid acrimony, may produce convulſions by irritating the nervous fabric of the ſtomach and inteſtines. For this purpoſe will be uſeful Venice-ſoap to diſſolve the coagulum, earthy abſorbents to obtund the

acid acrimony, gentle purgatives, and ſometime emetics, to evacuate the morbid humours may be o the greateſt ſervice. But when putrid humours ar lodged about the præcordia, whether they pre-exiſt ed before the fever, or are formed by and collecte together during the fever, purges and vomits wil indeed be uſeful; but the putrid acrimony may b moſt happily corrected by acids, which in the for mer cauſe would be prejudicial. Thus other re medies are required when the impervious blood i impacted into the veſſels of the brain from an in flammatory tenacity, than if the like obſtructio aroſe from a cold, mucous tenacity of the humour put into motion by a fever, as ſometimes happens in leucophlegmatic and old people. But relaxing medicines are more eſpecially uſeful for parts con tracted by a ſpaſm or cramp, concerning the par ticular uſefulneſs of which, ſee what has been ſaid in the commentaries to § 164 and 234, N°. 3.

By diluting, relaxing, and ſoftening medicines with revulſions, *&c.*] For diluents diſpoſe the humours to an eaſy motion, weaken almoſt every kind of acrimony, and ſo relax the veſſels, that they more eaſily tranſmit their fluids; at the ſame time they afford a proper vehicle to the urine and ſweat, that the acrimonious particles may be moſt commodiouſly expelled by thoſe ways from the body. At the ſame time all lenient decoctions, prepared from emollient herbs, mealy emulſions, ſweet expreſſed oils, food of barley, oats, and emollient pot-herbs are here likewiſe uſeful; inaſmuch as by theſe the body is filled with mild humours, all acrimony is obtunded and weakened, and all the veſſels are at the ſame time relaxed. But thoſe things which derive the impetus and quantity of the humours from the head towards other parts, are called revulſives, and they act either by diminiſhing the reſiſtance of the veſſels in thoſe parts, or by increaſ-

ing

ing the celerity of the motion of the humours through them. Hence bathing of the feet, the application of epiſpaſticks, frictions, and emollient clyſters often repeated are of the greateſt uſe.

It appears from the writings of the antient phyſicians, that they uſed the ſame remedies for the cure of convulſions (as may be collected from what was ſaid upon theſe ſubjects in the comment to § 164 and 234, N°. 3.) But there is one paſſage or two in Hippocrates [l], where he recommends pouring on of cold water for the cure of convulſions, though a little before [m] he had pronounced cold to be productive of convulſions and cramps, and to be an enemy to the brain, nerves, and ſpinal medulla. But it is well known that by plentifully pouring on cold water, the veſſels are contracted, and the blood condenſed; and therefore this method ſeems to be directly repugnant to thoſe remedies lately recommended. But then it is evident from the place before cited [n], that he obſerves the pouring on of cold water is only uſeful on ſome occaſions, and particularly in a tetanos without an ulcer, in a youth of a fleſhy habit and middle age; nor does he ſeem to aſcribe this effect upon the convulſed parts to the greater cold, but only ſays, *Frigidæ copioſæ profuſio caloris revocationem efficit.* "A plentiful effuſion of cold water takes off the "heat:" but that he rather aſcribes this cure to heat is evident, becauſe he afterwards ſubjoins, *Calor autem hæc ſolvit.* "But heat removes "theſe." But in another aphoriſm [o] he ſeems to aſcribe this effect to a ſtupidity produced by the pour-

[l] Aphor. 21. & 25. Sect. V. Charter. Tom. IX. pag. 206. 210.
[m] Aphor. 17. & 18. Sect. V. ibid. pag. 204.
[n] Aphor. 21. Sect. V. ibid. 206.
[o] Aphor. 25. Sect. V. ibid. 210.

pouring on of cold water, which supposes a weakened action of the nerves. But since the spirits flow impetuously through the nerves into the convulsed parts, it is evident in what manner this method will be sometimes useful, namely, in those cases where convulsions arise from an inordinate motion of the spirits; as for example, in hysterical patients; for then by that sudden shaking of the body which is produced by the pouring on of cold water, that direction of the spirits may be changed which occasions the convulsions; for we see that these disorders are often suddenly removed only by irritating the olfactory nerves by volatile spirits of sal-armoniac, castor, &c. For in these hysterical convulsions (which Hippocrates therefore terms slight or easy, as we observed before under the preceding aphorism) frequently almost any change introduced in the nerves will remove them, only by altering the present condition of the common sensory. Hence therefore the sprinkling of cold water often immediately removes such spasms: but for the cure of febrile convulsions this method does not seem to be safe.

Nor ought any confidence to be placed in such medicines as are endowed with the pompous title of nervous or antispastic for the cure of convulsions.] From all that has been here said under the title of convulsions, it is evidently apparent that there can be no universal antispasmodic remedy; but that such, however cried up, are either perfectly useless, or else are serviceable at one time, and mischievous at another, according to the variety of the causes from whence the convulsions arise. A plethoric youth afflicted with convulsions in an acute fever is cured by evacuations; but one exhausted by profuse evacuations is cured by repletion. When a topical inflammation of the brain

brain attends an acute fever, and excites convulsions, bleeding, and other remedies which allay the too great violence of the fever are the best: but on the contrary, Hippocrates [p] observes, *Quod convulsionem solvat febris superveniens acuta, quæ prius non fuit; si vero fuerit prius, jam exacerbata.* "That an acute fever, coming after convulsions, "when it did not attend before, removes them; "but that if the fever attended before the convul-"sions, they rage worse." And thus also in another place [q] he says, *Convulsione aut tetano laboranti febris succedens morbum solvit.* "A fever "succeeding after a convulsion or tetanos, termi-"nates that disease." Namely, when the stimulus or obstructing matter producing the convulsion is dissolved or weakened by the fever (see § 587.) for thus in the history of the tetanos, given under the preceding aphorism, the fever increased on the nineteenth day; but at the same time every thing was changed for the better. Sydenham has observed [r] that infants are often convulsed in the first stage of the small-pox or measles, namely, before the morbific matter is thrown out on the surface of the body by the fever, and he remarks, that thousands perished when the physicians attempted the cure by repeated clysters and other evacuations: for by that means the fever was depressed, by which the eruption of the small-pox and measles ought to have been promoted; and upon the appearance of which eruption those convulsions immediately ceased. It is therefore evident that no confidence ought to be placed in those medicines which are endowed with the title of specifically ner-

[p] Coac. Prænot. N°. 353, 354. Charter. Tom. VIII. pag. 871.

[q] Aphor. 57. Sect. IV. Charter. Tom. IX. pag. 171.

[r] In Dissertatione Epistolari pag. 459.

nervous, or antispasmodic. For if we examine into the confused heap of such remedies recommended by Hippocrates, it will appear that most of them possess the property of absorbing acidity, whence they are useful for children convulsed by an acid, of which kind are the powders of the countess of Kent, of pearl and mother of pearl, &c. Some again seem to be altogether inactive, as the raspings of ivory, elk's-hoof, harts-horn, &c. supposing they are taken crude; for if they are burnt into a calx, they acquire the property of absorbing acids. Others again, which are extremely useful in hysteric convulsions, are often prejudicial by their stimulating and heating power in febrile convulsions, more especially where there is an inflammatory thickness of the blood, or too great a force of the fever attending, as, for example, the spirits of harts-horn, ivory, blood, volatile oily salts, of castor, &c. The absorbent powders and specifics of elks-hoof, ivory, &c. may, and often ought to be used with safety, that the physician may satisfy the expectations of the patients and their friends, that he may not seem to have neglected any thing, because others very often extol them with great encomiums when they are called into consultations, more especially at the courts of the great; but at the same time care must be taken not to trust so far to these as to neglect other more efficacious remedies; and still greater care must be taken not to make use of those things which we know from the particular cause of the febrile convusion will be mischievous.

SECT.

SECT. DCCXIV.

BUT if the head is found to be the part originally affected, the cure ought to be conducted agreeable to what was before directed for a coma, § 706.

But if the cauſe of the febrile convulſion ſhall appear to reſide in the head, as the part originally affected, thoſe things will be uſeful which we recommended for the cure of a febrile delirium: And as at the ſame time a violent inflammation generally attends, the cure will be the ſame with that of a phrenzy, concerning which we ſhall treat hereafter at § 781.

Of

Of Febrile Sweats.

SECT. DCCXV.

SWEATS in the beginning of an acute fever, the cauſe of which fever is more than uſually obſtinate, acknowledge for their cauſe a relaxation and weakneſs of the extremities of the veſſels, a violent circulation of the blood through them, and an eaſy ſeparation of the watery from the other parts of the blood.

We have ſeen already at § 594, that ſometimes the material cauſe of the fever is ſubdued, diſſolved, and rendered moveable by the fever itſelf; yet ſo that it ſtill retains ſome conditions which are repugnant to the healthy or equable circulation; whence it is expelled from the body by ſome ſenſible evacuation. Among theſe evacuations are alſo ranked ſweats. But ſuch a ſweat is always good, and is ſaid to be critical. But the ſweat concerning which we are here ſpeaking is ſymptomatical, and almoſt conſtantly of an ill preſage, becauſe it removes little or nothing of the morbific matter, but only exhales the thinneſt parts of the blood. But that critical ſweat very rarely happens in the beginning of the diſeaſe, ſince it is the effect of nature overcoming the diſeaſe, and therefore can be only expected when the violence of the diſeaſe declines.

But by the beginning of an acute fever in this place we are not to underſtand that point of time wherein health degenerates to ſickneſs, but a conſiderable portion or ſtage of the courſe of the diſeaſe;

eaſe; namely, that whole time of the diſeaſe wherein no ſign of concoction as yet appears, as we obſerved before from Galen in the comment to § 590; and therefore in this ſenſe the beginning often comprehends a great part of that time of the diſeaſe which is uſually called its increaſe or aſcent, as we obſerved in the place laſt cited. But during this whole time the diſeaſe increaſes, and health is diminiſhed; and therefore any thing of good can ſeldom be hoped for from a ſweat breaking forth in this ſtage of the diſeaſe, ſince it commonly proceeds at that time from the ſuperiority or prevailing force of the diſeaſe. It is therefore evident that this beginning of an acute fever will admit of various latitudes, according as the fever runs thro' its courſe more ſwiftly or ſlowly, and as the material cauſe itſelf of the fever can be more eaſily or difficultly ſubdued by the force of the fever itſelf. For very acute diſeaſes [s] immediately bring on the moſt ſevere ſymptoms, and very ſpeedily finiſh their courſe: And for this reaſon is added in the text "the cauſe of which fever is more than uſually obſtinate," and conſequently will require more time to be ſubdued and rendered moveable; provided in the mean time it is not ſuch as may ſuddenly deſtroy the body by a raging force, or to make itſelf a way outwards. For, as we made it evident before (at § 594, N°. 2. from Hippocrates,) critical ſweats appear on the third, fifth, ſeventh, ninth, eleventh, fourteenth, ſeventeenth, twenty-firſt, thirty-firſt, and thirty-fourth day of the diſeaſe. See what is ſaid concerning this aphoriſm of Hippocrates in the comment to § 741, following, where we treat of critical days. Therefore in ſome acute fevers a ſweat appearing on the third day may be critical and ſalutary; while again in other acute fevers ſtill proceeding from

[s] Hippocr. Aphor. 7. Sect. I. pag 12.

from an obſtinate cauſe, a ſweat breaking forth on the third day may be ſymptomatic and prejudicial. A ſymptomatic ſweat may be therefore beſt of all diſtinguiſhed by its appearing without any previous ſigns of concoction in the firſt days of the diſeaſe, while the morbific matter ſtill continues crude; but a critical ſweat appears later, and after the ſigns of concoction have gone before: Having yet at the ſame time a due regard to the greater or leſs velocity with which the diſeaſe runs through its courſe.

But the cauſe of ſuch a ſweat is threefold, for either the extremities of the veſſels diſcharging the ſweat upon the ſurface of the ſkin are more relaxed, and by that means yield more eaſily to the fluids: Or elſe a greater quantity of the fluid is applied in a given time to theſe ſecretory and excretory organs by the greater violence of the circulation: Or laſtly, the watery and thinneſt parts of the blood cohere leſs powerfully to the reſt, ſo as to be more eaſily ſeparated. But theſe cauſes may either exiſt ſeparately, or elſe concurring together they may produce the greater effect.

That a greater laxity only of the cutaneous veſſels will occaſion ſweats, we are directly aſſured from experience. For when a ſtrong and healthy perſon has the ſurface of his body expoſed to the vapours of hot water, he ſoon runs down with ſweat, as frequently happens in the cure of the venereal diſeaſe by ſweating. When the whole ſurface of the ſkin is retained as it were in a vapourous bath of its own, by being covered up in bed with many cloaths, a ſweat is very eaſily excited. But on the contrary, when the cutaneous veſſels are conſtringed by the greater cold of the air, a ſweat can be either not at all raiſed, or with much greater difficulty, even though the perſon exerciſes himſelf

lf with violent motion of body. Hence the rea-
n is evident why a ſweat being once raiſed
ften diſpoſes the body ſo, that it afterwards melts
ith too profuſe ſweats, even from ſlight cauſes;
amely, becauſe the cutaneous veſſels are too much
laxed and weakened by the warm ſweat. Tulpius[t]
as a wonderful inſtance of this kind in a virgin,
ho from her infancy, on account of the ſweats fre-
uently raiſed in her mother when with child, had
eſe perſpiracles of the ſkin ſo large and open
at they were almoſt continually running, and
iſcharged ſo great a quantity of ſweat, that ſhe
as obliged to ſhift herſelf three or four times
very day. The cutaneous veſſels being ſtill more
eakened by theſe ſweats, the diſorder continued
ſtinate for ſeven years after the cure was under-
ken, even though the moſt convenient remedies
ere uſed.

But that a more violent circulation of the blood
xcites ſweat we are aſſured, ſince by muſcular mo-
on only the velocity of the circulation being vio-
ntly increaſed, a profuſe ſweat may be forced out
ven in the midſt of the ſevereſt winter.

But a more eaſy ſeparation of the watery from
e other parts of the blood, is juſtly ranked among
e cauſes of febrile ſweats. Chemiſtry de-
onſtrates that the greateſt part of the blood is
ater, which may be ſeparated from it by a very
entle degree of heat; inſomuch that Hoffman[u]
bſerves this watery part of the blood will evapo-
te much ſooner than any other kind of water
a like quantity, in the ſame place, and in a like
eſſel. But after the blood has been thus dried by
gentle heat, if then it be urged with a ſtronger
re, it yields various ſubſtances, from which ſtill

[t] Obſervat. Medic. Lib. III. cap. 42. pag. 257.
[u] Frid. Hoffman. Obſerv. Med. Chymic. pag. 298.

more water may be ſeparated. But in every perſon there is not the ſame degree of coheſion of the watery with the other parts of the blood, and therefore the ſeparation of them is not equally eaſy. When a man exerciſed with daily labour has blood taken from a vein, it congeals into a ſolid maſs, and the thinner parts do not ſeparate from the groſſer till it has ſtood for ſome hours, and even then the watery part is but ſmall in quantity. If the blood is examined which is taken from a delicate girl leading an inactive life, immediately a large quantity of a thin fluid ſeparates and floats on the ſurface of the thick cake. At the ſame time alſo it appears that the exerciſed and laborious people do not ſweat but by very hard labour; whereas weak girls often melt in ſweats even with the ſlighteſt exerciſe of body. For by the violent action of the ſtrong veſſels and viſcera the water ſeems to be intimately united to the other conſtituent principles of the blood, and cohere much more powerfully.

SECT. DCCXVI.

IF ſuch a ſweat continues for a conſiderable time, it deprives the blood of its diluent liquid, inſpiſſates what remains, and occaſions fatal obſtructions, the blood afterwards hardly admitting of an intimate mixture with diluent or reſolvent liquors; hence it may produce almoſt all kinds of acute diſeaſes.

A certain quantity of water was neceſſary in the blood, that by the interpoſition of its parts among the reſt of the groſſer principles the blood may be pre

prevented from concreting into a ſolid maſs, and by that means continue diſpoſed to flow through the ſmalleſt extremities of the arteries. For we ſee that the particles of the blood concrete together by drineſs, § 117, and on the other hand we demonſtrated that the cohering particles of the blood may be reſolved by diluting with an attenuating fluid intermixed (§ 132). If therefore a ſweat continues in the beginning of an acute fever, it diſſipates the diluent liquids, and renders the remaining maſs of the blood impervious; whence in a little time it heſitates in the ultimate extremities of the arteries, and from thence obſtructions, inflammations, and their worſt conſequences may follow. Many phyſicians have been of opinion that the morbific matter might be expelled by ſweats in acute diſeaſes, at leaſt in part, if not entirely; and therefore they inferred, that this diſcharge always abated the violence of the diſeaſe, more eſpecially as in the plague and a few other diſeaſes there is ſometimes a volatile miaſm this way expelled; and as the ſlighter febrile diſeaſes riſing only from an obſtructed perſpiration are often happily cured upon the appearance of a ſweat. But they deſpiſe the danger which ought juſtly to be feared from a diſſipation of the thinner parts of the blood, by thinking that this vehicle of the blood which was deſtroyed might be eaſily reſtored again by diluent watery drinks. We can indeed procure the watery drinks taken in and mixed with the blood in the veins to flow together with it through the veſſels, but it is very difficult to diſſolve thoſe parts of the blood which have been once united by the violence of the diſeaſe, and a want of that thin fluid, by the interpoſition of which its concretion was prevented; and even ſometimes it is altogether impoſſible to dilute theſe parts. For

the blood, thus rendered impervious, hesitates in the smallest extremities of the arteries, and by that means a passage is denied to the diluent liquors; and moreover, the cohesion of the conjoined particles is often so great that water cannot insinuate itself betwixt them, when they are concreted with a tenacity almost like that of a polypus, which being once formed is extremely difficult to resolve. Thus we see that the blood lately taken from a vein may be very easily diluted with warm water, but when it has once concreted, an entire dissolution of the concreted mass is impracticable. Hence appears the reason why sometimes great quantities of diluent liquors are drank without any relief in the most acute diseases; while at the same time the great quantity of thin and watery urine discharged denotes that the ingested water cannot be intimately mixed with the blood, but is immediately separated from it again, and discharged by the urinary passages; and therefore the salts and oils, rendered more acrid by the increased velocity of the circulation, are retained (see § 100), and the blood itself more and more inspissated with an inflammatory tenacity, so as absolutely to refuse all mixture with watery liquors; hence in a little time follow a delirium, coma, convulsions, and a fatal peripneumony, which may be expected from the destruction of the very tender small vessels by the retained acrimony, or else from such an obstruction of them by the impervious blood, that the functions thereon depending are destroyed. But it is very evident that all the same disorders are to be feared when the diluent liquors taken in are immediately dissipated by sweat. But what increased all these maladies was the forcing of sweats in acute diseases by hot and acrid remedies, as theriaca, saffron, volatile oily salts, &c. and in the mean time the pa-

tient was often prohibited from all drink, leſt the efficacy of ſuch medicines given ſhould be weakened. Upon this ſubject the paſſages, which Sydenham has interſperſed throughout his works, deſerve to be conſulted; for he was the firſt, and at that time almoſt the only phyſician who oppoſed the torrent of ſo bad a practice, and fought againſt this pernicious method of cure by very weighty arguments, eſtabliſhing the contrary method of cure by the happy event even in the moſt dangerous fevers.

SECT. DCCXVII.

SUCH a ſweat is therefore always to be ſuppreſſed in the beginning of a fever, unleſs the matter of the diſeaſe appears to be ſo ſubtle, that it may be diſſipated together with the firſt ſweat.

From what has been ſaid, therefore, it appears that a ſweat is prejudicial in the beginning of acute fevers, and that it ought for that reaſon to be ſuppreſſed: for the febrile matter which ought to be attenuated, ſubdued, and rendered moveable by a due moderation of the fever itſelf, is not yet diſpoſed to be that way evacuated. But this is alſo confirmed by the teſtimony of the antient phyſicians. For, *Sudor, una cum febre ortus, in acuto morbo malus eſt.* "A ſweat ariſing together with the fever, "in an acute diſeaſe, is bad," ſays Hippocrates[w]; and Celſus, where he treats of provoking ſweats, obſerves, that it may be raiſed two ways, either by a dry heat, or a bath. But he adds, that we ought to be careful of provoking ſweats by a dry heat,

[w] Coac. Prænot. N°. 574. Charter. Tom. VIII. pag. 885.

ne quid horum vel in febre, vel in cruditate tentetur. "Nor to attempt any thing of this kind in a fever, "or in the ſtage of crudity [x]." And in another place he orders, that if the fever is decreaſing or ending, and the ſigns denote a ſweat is about to appear; *Tum demum dare potui calidam aquam, cujus ſalubris effectus eſt, ſi ſudorem per omnia membra diffundit. Hujus autem rei cauſa, continere æger ſub veſte ſatis multa manus debet; eademque crura, pedeſque contegere: qua mole plerique ægros in ipſo impetu febris, potiſſimeque ubi ardens ea eſt, male habent* [y]. "That then indeed we may give warm water for "drink, whoſe effects are ſalutary, if it diffuſes a "ſweat through all the limbs. For this reaſon "the patient's arms and hands are kept under a "ſufficient quantity of cloathing; and in the ſame "manner the legs and feet are covered; but ſuch "a weight of cloathing is very bad for the pati-"ent in the violence or height of the fever, more "eſpecially when it is of the ardent kind." See alſo what has been ſaid upon this ſubject in the comment to § 594.

But we muſt except thoſe diſeaſes, the matter of which is ſo thin and moveable, that it may be diſſipated by the firſt ſweat, for then ſudorifics are uſeful given in the beginning of the diſeaſe. But this has been obſerved to take place chiefly in the plague and in peſtilential fevers. Hence Sydenham, who always condemns ſweats in other diſeaſes, yet admoniſhes that they are very uſeful in peſtilential fevers. For he then gave a ſudorific bolus of theriaca, electuarium de ovo, with ſaffron, &c. with ſome ſpoonfuls of an aromatic mixture; and afterwards loading the patient with cloaths, he by theſe means provoked a ſweat. Or even if a vomiting

[x] Celſ. Medic. Lib. II. cap. 17. pag. 93.
[y] Idem, Lib. III. cap. 6. pag. 130.

omiting prevented the taking of theſe ſudorific
nedicines, or occaſioned them to be rejected again
s ſoon as taken, he excited a ſweat only by the
veight of bed-cloaths; and when once the ſweat
egan to appear, the vomiting was immediately
uieted. But the ſweat being once begun, he con-
inued it for twenty-four hours with thin aromatic
quors drank; and if the patient's ſtrength failed
e recruited them with broths. But he obſerved,
hat towards the latter hours the ſweat flowed more
aturally, copiouſly, and in a manner critically, to
he great relief of the patient. Upon this ſubject
ee what has been ſaid in the commentaries to § 598,
34, 659. In that wonderful diſorder which has
een commonly termed Ephemera Britannica, or
udor Anglicus, even at the very firſt invaſion of
he diſeaſe, the patients perceived, as it were, a
ind of hot air diffuſed through their limbs, and
mmediately after a ſudden and profuſe ſweat
egan to flow [z], which, if ſuppreſſed, proved fatal
o the patient; nor did any fairly eſcape unleſs they
ad ſuffered ſuch a profuſe ſweat for twenty-four
ours. If the ſweat terminated ſooner, they ſoon
fter relapſed, or elſe fell into obſtinate diſeaſes [a].
Even when ſuch as were the moment before per-
fectly in health began to be invaded by this moſt
dangerous diſeaſe, it was not ſafe for them even to
ut off their cloaths, but they were obliged that
very inſtant to take to their bed. Or if the diſ-
eaſe invaded thoſe who were well and in bed, they
were obliged to keep themſelves there, and to
expoſe nothing but their face, nor even to move
about their limbs. Even if two people were taken
together by the diſeaſe in one bed, it was not
ufferable for them to change their apartment, but

[z] Joh. Caji de Ephem. Britann. p. 27.
[a] Ibidem, pag. 128.

they were obliged with great inconveniency to endure theſe troubleſome ſweats under the ſame bedcloaths [b]. But as in the height of the diſeaſe the patient was often delirious, ſervants were obliged to watch carefully, leſt the patient ſhould expoſe ſome part of the body to the immediate hazard of his life. But even the urine or inteſtinal fæces, the moſt neceſſary diſcharges did not permit the patients to riſe up in the bed, but they were taken away from under them by linen cloths [c]. So great was the care neceſſary to avoid ſuppreſſing the ſweat, which, when it happened, was followed ſoon after with a livid ſwelling of the body, and a ſenſation like the pricking of needles under the ſkin, attended with immediate danger of death.

In ſuch diſeaſes therefore alone can we expect any good from the immediate appearance of ſweats, which in other acute diſeaſes are always prejudicial. But it is by a careful attention only to ſuch diſeaſes as ſpread epidemically, that the phyſician can learn how he ought to conduct his practice, as will be hereafter declared more at large when we come to treat of epidemical diſeaſes.

[b] Ibidem, pag. 108. [c] Ibidem, pag. 128.

SECT.

SECT. DCCXVIII.

SUCH ſweats are prevented by leaving the bed, or by ſitting up in it, by freeing the body from too much covering, by admitting a moderately cool air, by abſtaining from ſuch things as are heating, or are made hot by fire, by often uſing much thin mild drink moderately cool, ſpeedily to reſtore the loſs of what was exhauſted, and laſtly, by reſtraining the too great velocity of the circulation; ſee § 102 to 106.

We come now to conſider how this ſweat, ariſing in the beginning of fevers, may be ſafely removed.

By leaving the bed, or by ſitting up, &c.] For when the patient lies ſweating in bed, the whole body is ſurrounded with warm and moiſt vapours, than which nothing more relaxes and weakens; but, as we reckoned (§ 715.) too great weakneſs and relaxation of the veſſels among the cauſes of febrile ſweat, it is evident that continual lying in bed increaſes the cauſe of ſweat. Hence Sydenham [d], fearing thoſe profuſe ſweats in the beginning of the ſmall-pox, will have the patients to ſit up, and not keep to their bed in the day-time. But no prudent perſon will adviſe the taking up of a ſweating patient ſuddenly out of bed, and to expoſe the body hardly covered to the cold air; ſince we have demonſtrated before, § 118, that ſo many and great diſorders may ariſe from the ſudden application of cold to a body hot, and in a ſweat. But the ſweat

[d] In Diſſertatione Epiſtolari, pag. 446, & alibi ſæpius.

ſweat is firſt to be leſſened by gradually removing the bed-cloaths, and then, when it has almoſt ceaſed, the patient may put on his cloaths and ſit in a chair; or if the weakneſs is ſo great as to forbid ſitting up, he may lie in this manner cloathed upon the bed only: but after this has been done, it will never hurt the patient to admit the moderately cool air, which will temperate the too great and troubleſome heat. But how prejudicial continual lying a-bed is, together with the confined air in fevers, has been ſaid before upon another occaſion (§ 698.) At the ſame time alſo the too great violence of the circulation may be leſſened, which is another cauſe of ſweat in fevers (§ 715.) ſince by this means a due moderation may be obtained with reſpect to the exorbitant force of the fever, as we demonſtrated in the comment to § 610. Nor is this a new invention of reſtraining ſweats in fevers; for Aegineta [e] recommends the ſame, when he ſays, *Cum vero ſudores largius eruperint, tunc abſtergendo, & levando integumenta recreare oportet. Etenim laſſant ſupra modum prodeuntes, ut in ſyncopen frequenter deduxerint. Tenue ergo ſit velamen & madidum, & aër frigidiuſculus, & ſomnus adjungatur & eventilatio.* "But when ſweats break "forth too copiouſly, the patient ought to be re- "freſhed by wiping them off, and by lightening "the bed-cloaths; for exceſſive ſweats ſo much "weaken the patient, that they frequently bring "on a fainting. The covering ought there- "fore to be thin, and the air cold and moiſt, and "to theſe ſhould be added ſleep, and a changing "or renewal of the air."

By abſtaining from ſuch things as are heating, or are made hot by fire.] For every thing which is either actually hot, or is endowed with a power of increaſing

[e] Lib. II. cap. 46. pag. 22. verſa.

easing the cauſes of our heat, excites ſweats. or in a hot air all people ſweat from the ſlighteſt uſes; and almoſt all aromatic and ſtimulating edicines are ſudorifics; more eſpecially if a me- od is taken to determine their action towards the rface of the body: which is more eſpecially ef- cted, when after taking theſe things the perſon s in bed covered with cloaths, and retained in a th of his own vapours.

By often uſing much thin and mild drink, &c.] For thus may be well reſtored thoſe parts which ave been exhauſted by too profuſe ſweats in fe- ers. But it is neceſſary for the drink to be thin nd mild, leſt it ſhould increaſe the violence of the irculation, as a ſtimulus. But drink moderately ool is preferable to that made warm, becauſe by arm drinks ſweats are increaſed, or at leaſt main- ained. Hence Sydenham, when he found it ne- eſſary to promote ſweats for the ſpace of twenty- our hours in the cure of peſtilential fevers, main- ained the ſweats once raiſed by warm drinks. But or very cold drink to be taken into a body much eated, more eſpecially in large quantities at a me, would be dangerous, ſince the blood is ſo aſily coagulated by intenſe cold, and is in the pre- nt caſe ſtill more inclined to concretion, by the iſſipation of its thinneſt parts into ſweats. It will e alſo beſt to give the drink in ſmall quantities, nd often repeated, becauſe if much thin liquor is uddenly mixed with the blood, it is immediately xpelled by the relaxed and open perſpiracles of he ſkin.

By reſtraining the too great velocity of the cir- ulation.] For every thing elſe being alike, the ecretion and excretion is increaſed in proporti- n as a greater quantity of the fluid is applied n the ſame ſpace of time to the ſecretory and ex-

cretory organs: and therefore the reaſon is evident why ſweat is excited by too great a velocity of the circulation. But every thing hitherto recommended is likewiſe of uſe to diminiſh the too great violence of the circulation, as will appear evident to one who conſiders what was ſaid before at § 610. But how, and by what means this exceſs of the circulation may be leſſened, has been explained in the aphoriſms here cited in the text.

But ſince a weakneſs and relaxation of the cutaneous veſſels has been ranked among the cauſes of ſweat (§ 715.) and as the remedies here recommended, do not ſeem to be ſo directly adapted to correct this weakneſs and laxity, therefore a peculiar treatment may ſeem neceſſary for this purpoſe. But a moderately cool air conſtringes theſe too much relaxed veſſels; and as they are leſs urged by the diminiſhed violence of the circulation, theſe dilated veſſels uſually contract to their former dimenſions by their natural elaſticity. But in the mean time we find in the writings of the antient phyſicians, that they likewiſe applied externally to the ſkin ſuch things as were capable of corroborating by their aſtringent virtue the too much relaxed cutaneous pores; and of this nature many things are recommended by Aegineta[f]. He even directs to anoint the body with oily or fat ſubſtances, which by obſtructing the latent paſſages of the ſkin, might prevent the moiſture from eſcaping. Thus it is known that the Romans uſed to anoint with oil the bodies of the athletæ, leſt by too violent exerciſe of body they ſhould melt in ſweats. Thus Celſus[g] alſo tells us, *Si vero ſudor exercet, duranda cutis eſt, vel nitro, vel ſale; quæ cum oleo miſcentur. At, ſi levius id vitium eſt, oleo corpus ungendum eſt:*

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[f] Lib. II. cap. 46. pag. 22. verſa.
[g] Lib. III. cap. 6. pag. 133.

vehementius, roſa, vel melino, vel myrteo, cui vi-um auſterum ſit adjectum. "That if a ſweat fa-'tigues the patient, the ſkin is to be hardened 'with nitre or ſalt, mixed with oil. But that if 'the diſorder is ſlight, the body is to be anointed 'with ſimple oil; but if more violent, with oil 'wherein roſes, millet, or myrtles have been in-'fuſed, to which ſome rough wine is to be added." But as many people cannot bear the application of fat ſubſtances without being immediately afflicted with an eryſipelas; and as ſprinkling the body with aſtringent powders, or to cover it all over with fomentations prepared with aſtringent medicines, gives great trouble; and as it is always unſafe to ſuppreſs a ſweat by obſtructing or conſtringing the pores, while at the ſame time the violence of the circulation continues to agitate the humours, and the ſame remedies ſeem to impede the ſenſible perſpiration; for theſe reaſons ſuch remedies are ſeldom put in practice, more eſpecially ſince by the other methods which we before propoſed, which are more ſafe and leſs troubleſome, the febrile ſweat may for the moſt part be happily reſtrained. Yet the obſervations with which we are furniſhed in medical hiſtory, teach us that ſuch things have ſometimes been uſeful. Thus, in a certain diſeaſe, familiar to the inhabitants of Bengal, the patients melted with moſt profuſe ſweats, to ſuppreſs which they ſprinkle the beds with linſeed; for that being moiſtened by the ſweat, forms a very tough mucilage, which, adhering to the ſkin, ſtops up its pores, and by that means reſtrains the ſweat [h].

There is ſtill another kind of ſweat which is uſually obſerved towards the end of long continual fevers; as alſo in thoſe who, having recovered from

[h] Lettres curieuſes & edificantes des miſſiones etrangeres, &c. Tom. XV. pag. 414.

from lingering fevers, are as yet weak and languid; and more eſpecially as Sydenham [i] well obſerves, if the patient eſcapes from thoſe diſeaſes after frequent and profuſe evacuations, and particularly if they had originally an infirm conſtitution of body before they were taken with the diſeaſe. For theſe are no ſooner laid in bed, though but moderately covered with cloaths, but they begin to grow hot, and ſoon after run down with ſweat; whence great weakneſs uſually follows, and there is danger of a conſumption. To thoſe thus affected Sydenham uſually gave five or ſix ſpoonfuls of old Malaga wine, by the uſe and virtue of which long continued, they gradually recovered ſtrength, and the ſweats diſappeared. I have often ſeen many good effects from an infuſion of ſage made in wine, and taken in a like quantity night and morning: or if the troubleſome ſweat does not yield to this, the ſame infuſion made with ſpirit of wine, and taken in the quantity of two ſpoonfuls twice a day, never fails; namely, when theſe night ſweats ariſe from this cauſe. It is well known that porters, when they are in a ſweat and thirſty with hard labour, take firſt a dram, and afterwards allay their thirſt with ſmall-beer, having experienced that without this precaution what they drink would ſoon be expelled in ſweats without refreſhing the body. From hence it is evident that ſpirituous liquors may be of great uſe to allay ſweats from too thin a ſtate of the humours, and a relaxation of the cutaneous veſſels.

[i] Sect. V. cap. 2. in fine pag. 291.

Of

Of a Febrile Diarrhœa.

SECT. DCCXIX.

A Diarrhœa or flux has for its matter, mucus, lymph, glue, pus or matter, ſanies, blood, and other juices derived from the noſe, mouth, fauces, œſophagus, ſtomach, liver, gall-bladder, pancreas, inteſtines, and meſentery; for its cauſe it acknowledges a violent expulſive force of the inteſtines, a weakneſs of the contractile powers of the inteſtines, or an impediment in the abſorbing veſſels of the inteſtines preventing their admittance of the juices.

A frequent diſcharge of liquid excrements by ſtool is called a diarrhœa (ἀπὸ τοῦ διαῤῥέειν) which ſignifies a perfluvium, *i. e.* a flux through the bowels; and in a ſtrict ſenſe the word is only thus uſed by phyſicians to denote the ſame thing. For although the excrements are diſcharged figured, but ſoft, for the moſt part in people who enjoy a ſound ſtate of health; yet in many it is a common thing for the bowels to be looſe without any detriment to their health; which has been alſo remarked by Hippocrates, who obſerves, that this alters by age; *Quibus per juventutem humidæ ſunt alvi, illis ſeneſcentibus exſiccantur. Quibus vero in juventute ſiccæ ſunt, illis ſenioribus humectantur.* "For in "thoſe who have a looſeneſs of their bowels in "their youth, they become dry when they grow "old. But thoſe who are coſtive in their youth "have

" have a looſeneſs when they are old[k]." But he does not in the leaſt judge a looſeneſs of the bowels to be morbid in youth, ſince in another place[l] he has pronounced that young people who have a looſeneſs of their bowels have their health better than thoſe who are conſtipated. A humidity therefore of the bowels is not ſufficient to term it a diarrhœa, but there ought likewiſe to attend a frequent diſcharge by ſtool, having always a regard to the natural habit of the patient, which is ſo very different in various people, with reſpect to this evacuation: For there are many who go to ſtool ſeveral times in a day, though at the ſame time they otherwiſe enjoy a ſound ſtate of health; others again go but once a day, or not ſo often. A perſon is therefore ſaid to be afflicted with a diarrhœa, when there is a more than uſually frequent and fluid diſcharge of the fæces; but when this more frequent and liquid diſcharge of the excrements is accompanied with a conſiderable pain, it is uſually called a dyſentery, or an ill diſpoſition and difficulty of the inteſtines. From whence the ſame diſeaſe is alſo by Celſus[m] called *Tormina*, the gripes; though other authors would have it called a dyſentery only when there is an ulceration of the inteſtines, and a diſcharge of blood by ſtool; as we ſhall ſee more at large hereafter § 721. But when the ingeſted food is expelled by ſtool hardly altered, it is commonly called λειεντερία, *ſive lævitas inteſtinorum, qua continere nihil poſſunt, & quidquid aſſumptum eſt, inconfectum protinus reddunt*, " A lientery or ſmoothneſs of the inteſtines, in " which they can retain nothing, but imme- " diately diſcharge whatever is taken in undigeſt- " ed;

[k] Aphor. 20. Sect. II. Charter. Tom. I. pag. 60.
[l] Aphor. 53. Sect. II. ibid. pag. 89.
[m] Lib. IV. cap. 15. pag. 224.

" ed [n];" from a laxity and as it were a palsy in the fibres of the stomach and intestines. But this disease may be included under the general definition of a diarrhœa, as a species under the genus, as may also another disorder akin to this, which is usually called by authors the *affectio cœliaca*; in which the aliments are expelled, not perfectly crude and unaltered under a liquid form, but the chyle is discharged together with the fæces [o], which naturally used to be absorbed by the lacteal vessels, before the fæces remaining after the food is discharged by stool. But the term cœliac passion is not found used by authors in such a restrained sense. Indeed in Aretæus [p] we have such a description which teaches that the cœliac passion differs only in degree from a lientery, since in a lientery the aliments are soon expelled by stool crude and unaltered; but in the cæliac passion, *Liquescit a calore alimentum, sed non concoquit calor, neque in succum proprium vertit semicoctum & imperfectum relinquens.* " The ali-
' ment is liquified, but not concocted by the heat,
' nor changed into its proper juice, but is left im-
' perfect, and only half concocted." But in another place, where he treats of the cure of this disease [q], he has the following passage; *Si ventriculus ciborum impotens sit, perfluat autem alimentum, non coctum, non mutatum, crudum, nihilque ad corporis molem transeat, cœliacos hos appellamus:* If the
' stomach is not capable of digesting the food, but
' the aliment flows through it not concocted, nor
' changed, but crude, without any of it passing
' into the body, we call these patients cœliacal;"
which definition certainly agrees very well with a

[n] Lib. IV. cap. 16. pag. 226. Med. Sect. DCCCXIII.
[o] H. Boerh. Institut. morbor. diuturnor. cap. 7. pag. 58.
[p] Lib. II. de causis & signis diuturnor. Lib. II. cap. 7. pag. 132.
[q] De curat. morbor.

lientery. But in Celſus the cœliacal diſeaſe of the ſtomach, as it is called, is very different: For thus he expreſſes himſelf; *In ipſius vero ventriculi porta conſiſtit is, qui & longus eſſe conſuevit, &* Κοιλιακὸς *a græcis nominatur. Sub hoc venter indureſcit, dolorque ejus eſt: alvus nihil reddit, ac ne ſpiritum quidem tranſmittit: extremæ partes frigeſcunt: difficulter ſpiritus redditur.* "But in the gate of the "ſtomach itſelf is lodged that which is uſually a "diſorder of long continuance, and called Κοιλιακὸς "by the Greeks: In this diſorder the belly "ſeems hard, and is painful; nothing is diſcharged "by ſtool, and the bowels do not even tranſmit "air; the extreme parts grow cold, and the "breathing is difficult[r]." Yet it has obtained from cuſtom with us to call it the cœliac paſſion, when the aliments are in ſome degree concocted, and retained a longer time in the ſtomach, and not ſo ſoon expelled by ſtool as in a lientery, in which the food is diſcharged by ſtool perfectly crude, as it was at firſt taken in, with ſo great and manifeſt a degree of crudity, that one plainly perceives the kind of the food taken in[s]. And therefore in this ſenſe the cœliac paſſion may be ranked among the kinds of a diarrhœa.

But in conſidering a diarrhœa three things are more eſpecially to be regarded, namely, the difference of the matter evacuated; the different parts of the body from whence that matter is derived; and laſtly, the cauſes which occaſion that matter to be depoſited in the cavity of the inteſtines, and afterwards to be expelled by ſtool; all which ought to be well known, in order to form a prognoſis and indications for the cure. We ſhall firſt ſee what medica-

[r] Celſ. Lib. IV. cap. 12. pag. 220.

[s] Gorræi defin. Medic. pag. 322.

medical obſervations have taught us concerning the matter diſcharged by a diarrhœa.

Mucus.] By this name we call a ropy thick humour hardening into ſcales, and drying up to a tophaceous matter, reſolvable again in water only by maceration. All theſe properties we find in the mucus of the noſtrils, which ſerves to lubricate and defend the internal membranes of the noſe. But as we ſaid before at § 75, a mucus of the ſame kind lines the fauces, internal parts of the mouth, œſophagus, ſtomach, and anoints the whole internal ſurface of the inteſtines, whence it will not ſeem at all wonderful if mucus is ſometimes expelled by ſtool in a diarrhœa. Such mucous ſtools therefore are diſcharged, when the natural mucus lining theſe parts is firſt accumulated in a large quantity. Sometimes alſo in diſeaſes the organs, which ſeparate this mucus, are ſo diſpoſed that they form a much greater quantity than is natural. This is evident in catarrhs, when men who are in health, having their noſes commonly dry, diſcharge daily an incredible quantity of mucus; and as the like mucous follicles are diſperſed throughout the internal ſurface of the ſtomach and inteſtines, it is ſufficiently evident that theſe being affected in the like manner, may collect and diſcharge a very great quantity of mucus by ſtool. Hence Hippocrates [t] obſerves, *Hominibus, capita humida & pituitoſa habentibus, ventres crebro exturbari, pituita à capite defluente.* "That people who have their heads "moiſt and phlegmatic, have frequently their "bowels diſturbed by the phlegm flowing from "the head." And in another place [u], *Quibus in diarrhœis ſpumoſæ fiunt dejectiones, illis capite pituita defluit.* "That in thoſe who have frothy

[t] De aere locis & aquis, cap. 2. Charter. Tom. VI. pag. 189.
[u] Aphor. 30. Sect. VII. Charter. Tom. IX. pag. 306.

" dejections in a diarrhœa, there is in them a de-
" fluxion of phlegm from the head." For the
antients, ignorant of the circulation, when they saw
a sudden collection of phlegm in any part, and did
not understand by what force or by what passages
it was derived thither, they believed it to be col-
lected in the brain, which they pronounced to be
the coldest and the least abounding with blood,
from whence they supposed it to flow to the other
parts of the body; and from hence they gave the
name of catarrh from its flowing downwards.

Lymph.] The saliva of the mouth swallowed,
the liquor secreted by the exhaling arteries of the
stomach and intestines, the pancreatic juice, and
the hepatic bile which is so dilute and thin, may
all conduce to form the matter of a lymphatic or
serous diarrhœa. For if we consider the quantity
of saliva swallowed, the great number of the arte-
rial ducts opening into the cavity of the stomach
and intestines with the great bulk of the liver and
pancreas, it will be sufficiently evident that a very
large quantity of lymph continually distils into the
cavity of the intestines, which is again absorbed
in health; but which in diseases is sometimes dis-
charged by stool, to the great damage of the body,
since by this means a great quantity of the healthy
humours is exhausted, and the due preparation of
the chyle from the ingested food is hindered, in-
asmuch as that depends in a great measure on the
mixture of the healthy humours with the crude
juices of the aliments. Hence if such a diarrhœa
continues for a long time, there usually follows
great weakness and very bad obstructions of the
abdominal viscera. But sometimes also the lymph
stagnating in other parts of the body is absorbed by
the veins, and mixing with the circulating hu-
mours is afterwards this way evacuated from the

body, as we ſometimes obſerve with ſalutary effects in a dropſy. Hence Hippocrates [w] ſays; *Ab hydrope detento, aqua ſecundum venas in ventrem fluente, (morbi) ſolutio. In hydrope incipiente, diarrhœa aquoſa facta, citra cruditatem, morbum ſolvit* [x]. "That the water retained in the abdomen, in a dropſy, flowing a ſecond time into the veins, terminates the diſeaſe. And that a watery diarrhœa in an incipient dropſy without crudity removes the diſeaſe [x]."

Glue.] More tenacious than the natural mucus, and ſometimes produced of that accumulated, and thickened by long ſtanding; but ſometimes the glue ariſes from what is taken into the body (ſee what has been ſaid before under the title of diſeaſes ariſing from a ſpontaneous glue.) There are wonderful inſtances of ſuch glutinous concretions in the inteſtines, given us in medical hiſtory. The ambaſſador of the Emperor Charles V. was tormented with a pain together with a tumour in the right hypochondrium, continued along the bottom of the ſtomach to the left ſide. He had for the ſpace of ſix years made uſe of emollient remedies proper to remove the ſcirrhus, as the phyſicians imagined this tumour to be of that kind: at length a pretty ſharp clyſter being applied, there was diſcharged a hard body perforated in the middle of about a foot in length, which the patient was afraid was part of his inteſtines. But as he was thereby immediately relieved, he again permitted a ſecond and a third clyſter; and after the diſcharge of more of the like matter he lived well in health [y]. In another there was a diſeaſe ſomething

[w] Aphor. 14. Sect. VI. Charter. Tom. IX. pag. 255, & Coac. Prænot. N°. 461. Charter. Tom. VIII. pag. 879.

[x] Ibid. N°. 457, pag. 878.

[y] Fernel Pathol. Lib. VI. cap. pag. 9. 157.

like this, but more violent, which totally intercepted the paſſage of the inteſtines; and after death the inteſtinum colon was found ſo much ſtuffed up with concreted phlegm, that it perfectly reſembled a ſolid, and none of the fæces could be diſcharged by ſtool. Hitherto may be alſo referred that kind of phlegm which is called vitreous, being pellucid like glaſs, and trembling like a jelly, or the white of an egg, as we ſometimes ſee diſcharged by ſtool: See what has been ſaid in the comment to § 71.

Pus or matter, and ſanies.] Namely, when a vomica breaking in the ſtomach, inteſtines, or adjacent viſcera, diſcharges matter into theſe parts where they uſed to convey their healthy humours. But even in other parts of the body whch do not directly evacuate themſelves into the ſtomach and inteſtines, matter lodged may be evacuated or depoſited into the inteſtines by metaſtaſis; which we demonſtrated by ſeveral obſervations in the comment to § 406. The ſame is alſo true of laudable matter which has been ſo long confined in a cloſe abſceſs, as to change into ſanies, or corrupt matter.

Blood.] When the fæces are diſcharged bloody from an eroſion or ulceration of the inteſtines by acrid humours, there is pain and griping attend at the ſame time; and then the diſorder ought rather to be called a bleeding dyſentery than a diarrhœa. But it ſometimes happens that blood is diſcharged by the anus without any conſiderable pain by the dilated mouths of the hepatic or meſenteric veſſels, or from the hemorrhoidal veſſels without a rupture of them; but that a like hæmorrhage muſt enſue from a rupture of thoſe veſſels is evident to all. Thus I remember myſelf to have ſometimes ſeen, after the moſt troubleſome and long continued pains of

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the upper orifice of the ſtomach, that a conſiderable quantity of blood has been diſcharged by the anus without any pain, but ſoon after has followed great weakneſs with faintings and death. But when this happens from a dilatation of the mouths of the veſſels only, the danger is not ſo great; for frequently ſuch a diſcharge of blood is ſalutary, as it leſſens the too great quantity, and often ſupplies the deficiency of the other natural diſcharges of blood. Thus I have known ſeveral men feeding plentifully, and living an idle life, with whom it is a common thing to diſcharge pure plood three or four times in a year by the anus, without any detriment to their health, but rather they found themſelves much better after ſuch an evacuation. Galen obſerves [z] that blood is diſcharged in ſome people by a kind of circuition either from the loſs of limbs (ſee the comment to § 174) or from a neglect of exerciſe. And in another place [a], after having ſaid the like, he adds as follows, *At viſa eſt quoque mulieribus, ſuppreſſis menſibus, hujuſmodi per ſedem ſanguinis vacuatio fieri; ut & nonnullis per vomitum ob eandem cauſam. Verum & his quidem ſincerus ſanguis excernitur, ſimilis ei, qui mactata victima profunditur; modo per alvum inferiorem, modo per ſuperiorem.* "But we alſo obſerve that ſuch an evacuation of blood by ſtool happens in women who have a ſuppreſſion of the menſes: and in ſome a like diſcharge of blood by vomiting has proceeded from the ſame cauſe. But then in theſe caſes the blood is diſcharged pure, like that which is poured forth upon ſlaying an animal; and this is ſometimes evacuated downward by ſtool, and ſometimes upward."

[z] De Symptom. cauſis, Lib. III. cap. 7. Charter. Tom. VII. pap. 97.

[a] De locis affectis, Lib. V. cap. ultimo, ibid. pag. 503.

Theſe are principally the humours which compoſe the matter of a diarrhœa; but then to theſe the bile is to be added, as is evident enough, tho' it has not been conſidered among the former. But immediately hereafter, where we treat of the parts from whence the matter of a diarrhœa flows to be evacuated, the gall-bladder is mentioned. Now, according to the various mixture of all theſe humours among themſelves there ariſes a great difference. But beſides theſe there are ſometimes more extraordinary caſes happen, wherein another kind of matter may be diſcharged by ſtool, which cannot be referred to any of thoſe beforementioned. Thus in Tulpius we read [b] of a comely and tender woman, who being frequently afflicted with a tertian fever, or an obſtruction of the ſpleen, at length diſcharged daily a great quantity of yellow fat floating upon the fæces for the ſpace of fourteen months, or longer, ſo that it reſembled melted butter; and this ſhe diſcharged in ſo great a quantity that it filled ſeveral cups. But that it was really fat appeared from its yielding a clear flame when it was thrown upon burning coals, and when it was once cold it hardened like ſolid fat. But this fat was always diſcharged by ſtool without gripings, and without any colliquative fever, which moſt phyſicians ſuſpected, and without any waſting or falling away of the body; inſomuch that the woman then continued in a good ſtate of health, being the ſixteenth year after this diſcharge. Another caſe of the like nature is related by the ſame author [c].

Of the noſtrils, mouth, fauces, &c.] We come now to the enumeration of thoſe parts from whence the matter of a diarrhœa may be derived into

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[b] Lib. III. cap. 18. pag. 208.
[c] Ibid. cap. 19. pag. 210.

to the cavity of the inteſtines, ſo that it may be afterwards expelled from thence by ſtool. But from all the forementioned places there is a direct paſſage into the inteſtines. For, from the noſtrils the humours may ſlip down into the fauces, and from thence into the ſtomach and inteſtines; and from hence ſometimes both the patient and the phyſician have been alarmed without juſt cauſe, when blood flowing from the noſe and ſwallowed in the ſleep, has been afterwards diſcharged by ſtool. Hence alſo a great quantity of mucus is often diſcharged by ſtool in young children, when they ſwallow the mucus, which ſlips down from the noſtrils into the fauces when they have taken cold, or when the like mucus is coughed up from the lungs. From the liver there is a paſſage open into the inteſtinum duodenum by the porus biliarius, and from the gall-bladder by the cyſtic duct; and from thence may follow bilious, hepatic, atrabiliary, and other diarrhœas. The ſame is alſo true of the pancreas. But the inteſtines are alſo furniſhed with innumerable arterial ducts exhaling humours into their cavity, ſeparated from the blood, and theſe are alſo accompanied with abſorbing veins, as we are taught from anatomical injections, made as well by the branches of the vena portarum, as by the meſenteric arteries; and therefore humours may be alſo derived from theſe veſſels into the inteſtines; and that the quantity of theſe humours may be very conſiderable will appear from conſidering the number of theſe veſſels, and that their extremities opening into the cavity of the inteſtines, ſeem to be very eaſily dilatable, ſince they even tranſmit the ceraceous matter of an injection, as Ruyſch obſerves in ſeveral places, and as I have myſelf ſometimes ſeen, even though the injection is not urged into the veſſels with a great force, nor

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any ſigns appear afterwards of the matter being extravaſated by a rupture of the veſſels, when the inteſtines thus filled have been inflated and dried. But although the ſmall venous ducts naturally abſorb the humours contained in the cavity of the inteſtines, yet as all thoſe veins diſcharge themſelves into the trunk of the vena portarum, and as that vein diſtributed through the liver performs the office of an artery, an impediment being formed againſt the free courſe of the humours, through the ultimate extremities of the vena portarum in the liver, the humours may then be obliged to return with a retrograde motion from the veins into the cavity of the inteſtines, when, after exciting extreme anguiſh, they are urged by the force of vomiting and an increaſed reſpiration. See what has been ſaid concerning this retrograde motion of the humours in the comment to § 631.

But if the reſiſtance be diminiſhed in the veſſels, or if the impulſe of the fluids moving thro' them be increaſed from any cauſe, there may then be a quantity of humours derived from other parts towards the cavity of the inteſtines; whence it is evident that the humours derived from other, and moſt diſtant parts of the body, may be diſcharged by ſtool. Thus we know that by the repeated uſe of purgative medicines the whole body may be exhauſted; and that the ſame may happen from a long continued diarrhœa, we ſhall declare hereafter. But this appears in nothing ſo evident as in the diſeaſe termed the cholera morbus, where of a ſudden, in a few hours time there is ſo great a diſcharge of the humours both by vomiting and ſtool, that the whole body is exhauſted, the face looks pale and collapſed, all the ſtrength is deſtroyed, and even ſometimes convulſions are obſerved from ſo profuſe and ſudden inanition, even though not ſo much as a drop of blood is

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diſcharged either upward or downward: and this I have often obſerved with great admiration, and particularly in a ſtrong girl, who in the ſpace of three hours had her face ſo much altered and collapſed by this diſeaſe, that her moſt intimate acquaintance could not know her; all the humours being diſſolved as it were by a poiſonous force, and violently expelled by vomiting and ſtool.

For its cauſe it acknowledges a violent expulſive force of the inteſtines, *&c.*] We have already ſeen the nature and ſeveral kinds of the matter of a diarrhœa; and from what parts this matter may be derived into the cavity of the inteſtines. Whatever therefore occaſions the humours to be derived in a greater quantity towards the cavity of the inteſtines, may in that reſpect be the cauſe of a diarrhœa; and therefore a diarrhœa ſuppoſes a violent expulſive force in the inteſtines. But this cauſe alone is not ſufficient; for if the abſorbing veins which are found opening throughout every point of the internal ſurface of the ſtomach and inteſtines, imbibe again the humours forced upon thoſe parts, there will be no diarrhœa. For when a healthy perſon drinks twelve pints of Spa-water, there is often not ſo much as a drop diſcharged by ſtool; for though ſo great a quantity of liquor is conveyed into the inteſtines, yet it is all abſorbed by the bibulous veins, and diſcharged from the body by the paſſages either of the urine or ſweat. There is therefore required ſo great a contractile force in the inteſtines, as to enable them to confine ſo great a quantity of liquor, and prevent it from eſcaping by ſtool. But when theſe contractile powers are weakened, the liquor taken in by the mouth, or depoſited into the cavity of the inteſtines from their own or the meſenteric veſſels, or thoſe of the adjacent viſcera, then eſcapes by ſtool,

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at leaſt a part of it, or elſe all of it, if the inteſtines are perfectly relaxed, or in a manner rendered paralytic. In the firſt caſe the evacuation by ſtool is liquid and frequent, and in the latter caſe there will be a lientery when the ingeſted food or the humours expelled into the cavity of the inteſtines, are by their own weight and the force of the reſpiration expelled by ſtool, little or nothing altered; and often even againſt the patient's will, which is then always a very bad ſign, inaſmuch as it denotes a perfect palſy or relaxation of the inteſtines. Hence Hippocrates [d] has pronounced thoſe evacuations by ſtool to be fatal which are made without the knowledge of the patient. But as this ſometimes happens to delirious and phrenetic patients rather from an injury of the brain than from a palſy of the inteſtines, therefore in another place he has made a greater reſtriction to this prognoſis, when he ſays [e], *Ab alvo tenuia non ſentienti tranſire, ei qui apud ſe ſit, malum: ut hepatico.* "Thin ſtools "coming away without the patient knowing "what happens to him is bad; as when the liver "is diſordered." Hence alſo aſtringents are of ſervice by corroborating the too lax fibres of the inteſtines, as will be ſaid hereafter in the cure of this diſorder, and likewiſe ſtimulating aromatics are often of much uſe, as they irritate the inactive fibres into more violent contractions. Hence the reaſon is evident why Hippocrates ſays, [f] *In diuturnis lienteriis ructus acidus obortus, qui prius non aderat, bonum ſignum.* "That acid belchings ariſing in li-"enteries of a long ſtanding, which they did not "attend before, are a good ſign." For it denotes that the contractile force of the ſtomach and in-

[d] In Coacis Prænotionibus N°. 631. Charter. Tom. VIII. pag. 890.

[e] Prorrhet. Lib. I. ibid. pag. 750.

[f] Aphor. I. Sect. VI. Charter. Tom. IX. pag. 245.

inteſtines is in ſome meaſure returned, whereby the ingeſted aliments may be retained at leaſt ſo long that they begin to degenerate into a ſpontaneous corruption; whereas, in a lientery, properly ſo called, every thing taken in is ſpeedily evacuated unaltered by ſtool.

But beſides this weakneſs of the contractile powers of the inteſtines, there ſeems to be another cauſe of a diarrhœa. For we know that the inteſtines are naturally agitated with a kind of vermicular motion, as appears even to the naked eye in the diſſection of living animals, and when the inteſtines of mankind have been expoſed to view by wounds or other cauſes (ſee the comment to § 948): and this is called the periſtaltic motion, by which the fibres of the inteſtines, contracting themſelves ſucceſſively in different parts, apply the abſorbing venal ducts to thoſe things which are contained in the cavity of the inteſtines; and by this means the contents are gradually propelled throughout the whole length of the inteſtinal tube, even to the anus. But theſe internal contents ſuffer a great remora or retention before they reach the anus, becauſe of the many folds or eminencies contracting the cavity of the inteſtines, and from the retrograde periſtaltic motion repelling the contents back again. For if any one carefully examines by the eye the inteſtines of the living animal after the abdomen has been cut open, it will plainly appear that the inteſtinal contents are propelled by the periſtaltic motion; and that ſoon after the ſame motion becoming retrograde, repels back again the contents, which are again propelled forward the next inſtant, and by that means very ſlowly conveyed towards the anus. But this done, that the food, drink, and humours conveyed thro' ſo great a length of the inteſtines, might be every moment applied to the mouths of the abſorbing veins,

veins, and be drained almoſt entirely of their juices, and that the remaining fæces deprived of all their uſeful moiſture being figured, but as yet ſoft for the moſt part in healthy people, may be excluded by ſtool. But in people who are perfectly in health, there ſeems to be a determinate ſpace of time neceſſary for the performance of this whole motion from the mouth to the anus, but varying in different people: and this may be experienced by any one by ſwallowing whole currants, which are always diſcharged entire in the fæces, which being afterwards inſpected will ſhew the interval of time betwixt their taking in and excluſion. Hence alſo it is common with moſt people to go to ſtool at an uſual time. Hence Hippocrates [g] ſays, *Alvi dejectio optima eſt mollis, compacta, ſubfulva, non valde graveolens, prodiens hora conſueta, copia pro ratione ingeſtorum. Tali enim dejectione exiſtente, inferior venter ſanus eſt.* "That the beſt ſtools are "ſoft, cloſe, of a dark yellowiſh colour, not very "fœtid, and diſcharged at an uſual time or hour, "in a quantity proportionable to the food taken in. "For when the ſtools are thus conditioned, the "abdomen or lower venter is in a healthy ſtate."

If therefore from any cauſe the inteſtines are ſo irritated, that their contents arrive ſooner at the anus by the more quick and violent periſtaltic motion, there will not be time enough allowed for the venal ducts to abſorb all the juices of the aliments; and therefore the ſtools will be more frequent and liquid, that is to ſay a diarrhœa will attend. Moreover, by ſuch a ſwift propulſion the ingeſted food may be diſcharged by ſtool little altered; and thus a lientery will attend, which is com-

[g] Coac. Prænot. N°. 601. Charter. Tom. VIII. pag. 888. & in Prognoſticis ibidem, pag. 626.

commonly aſcribed only to a palſy of the inteſtines. Hence Galen [h] obſerves, that the name given to a lientery is of bad import, denoting a ſmoothneſs of the inteſtines, and ſuppoſing that the diſeaſe may be produced when ſharp corroding humours irritate the ſtomach and inteſtines. He alſo adds, that the inteſtines being ulcerated by ſuch crude and acrid humours, are ſo ſtimulated by the food paſſing on, that they very ſoon urge forward their contents; more eſpecially when this happens throughout the whole tract of the inteſtines, the quickneſs of the paſſage will be ſuch that there will be no ſigns of concoction. But although he would aſcribe ſuch a lientery to a weakneſs of the ſtomach and inteſtines; yet it is ſufficiently evident from what follows in the ſame place, that he only underſtands a weakneſs of the digeſtion, and not a weakneſs of that power by which the ſtomach and inteſtines contract themſelves, and protrude their contents towards the anus. But in order to diſtinguiſh theſe two kinds of the lientery, he ſays; that which ariſes from acrid humours irritating the ſtomach and inteſtines is accompanied with a ſenſe of the heart-burn, or gnawing pain; but on the contrary, that which ariſes only from a weakneſs of the ſtomach and inteſtines, is deſtitute of all ſenſe of pain.

But that this motion of the inteſtines, protruding their contents towards the anus, is accelerated by every thing that ſtimulates, appears from the action of purgative medicines, which by their irritation ſeem to draw the humours towards this part, and at the ſame time to increaſe this motion. For although there is often occaſion for the greateſt ſtraining of the abdominal muſcles and diaphragm to

[h] Commentar. in Aphor. 1. Sect. VI. Charter. Tom. IX. pag. 246.

to expel the hard fæces, yet it is certain that they may be diſcharged by the action of the inteſtines only, ſince ſometimes the ſtools are depoſited ſuddenly and againſt the ſtrongeſt endeavours of the will. This is confirmed by a fair experiment of Wepfer [i]: For, to a puppy he gave a ſcruple of glaſs of antimony with milk, and three hours afterwards cut open the abdomen, from whence the inteſtines hung out naked, but the animal diſcharged yellow fæces by ſtool, nearly of their natural conſiſtence, only by the force of the inteſtines, as evidently appears. Hence the reaſon is alſo evident why after taking of purges, and in a ſpontaneous diarrhœa, there is a conſiderable murmuring noiſe heard in the inteſtines, and frequently gripes go before the bowels are evacuated, though they are not ſo troubleſome and frequent as in a dyſentery, but proceed merely from the periſtaltic motion of the inteſtines accelerated. It is likewiſe evident from what has been ſaid, why Hippocrates pronounces: *Prædicere autem oportet, excretionem ſubtus erumpentem deſituram eſſe, quum ventrem manu tangenti nullus motus occurrerit, & in fine dejectionis flatus exiverit.* "That we ought to predict "the excretion of the humours breaking forth will "ſuddenly deſiſt, when no motion can be per-"ceived in the belly felt by the hand, and when "in the end of the evacuation no flatus is diſ-"charged [k]."

When therefore a weakneſs of the contractile powers of the inteſtines is in the text placed as the cauſe of a diarrhœa, it is to be underſtood not only as if the inteſtines let ſlip their contents, in every diarrhœa where they are relaxed and paraly-

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[i] Cicut. Aquat. Hiſtor. cap. 20. pag. 253.

[k] Prorrheticor. Lib. II. cap. 13. Charter. Tom. VIII. pag. 822.

tic, but alſo inaſmuch as the natural effect of their contraction, namely the abſorption of the juices by the bibulous veins is diminiſhed; even though the contractile force of the inteſtines remains ſtrong enough, and their contents only are expelled by a quicker periſtaltic motion. In the ſame manner alſo Galen ſeems to have propoſed the cauſe of a lientery to conſiſt in a weakneſs of the ſtomach and inteſtines, as we obſerved a little before, even tho' it may be produced by acrid humours irritating theſe parts. Hence alſo it is recommended to correct or obtund what is acrid and irritating in the cure of a diarrhœa (§ 722.) Whence it is evident that the words of the text are to be underſtood in this ſenſe.

Or obſtructions in the abſorbing veſſels of the inteſtines preventing their admittance of the juices.] If we conſider that the ſaliva ſwallowed, with the pancreatic juice and hepatic bile, are continually conveyed into the inteſtines, and that in every point of the internal ſurface of the ſtomach and inteſtines, there are ſmall arterial ducts which exhale thin humours, it will appear that a great quantity of liquids muſt be collected in the cavity of the inteſtines; to which again are to be added the food and drink taken in. But naturally almoſt all theſe juices are abſorbed by the lacteal veins, or by the meſenteric veins are conveyed to the great trunk of the vena portarum, the ſolid fæces only being expelled by ſtool. If therefore there ſhould be any impediment preventing the abſorption of the liquids contained in the inteſtines, the ſtools muſt conſequently become more fluid and copious, as the inteſtines are irritated into more frequent contractions either from the maſs of their contents only, or from the inteſtines being perfectly relaxed or paralytic, ſo as to let their contained fluids eſcape only by the preſſure of reſpiration. But although

an impediment being formed in the branches of the vena portarum diſtributed through the ſubſtance of the liver, may hinder the meſenteric veins from freely diſcharging themſelves, whence they cannot conveniently receive the humours to be abſorbed from the cavity of the inteſtines; yet this cauſe of a diarrhœa is leſs frequent, becauſe the veins may eaſily be diſtended in ſuch a caſe, 'till at length after the greateſt anguiſh and vomiting, the humours are preſſed back from the veins into the arteries, and by that means the larger veins are again emptied (ſee § 631, 632.) But the mouths of the ſmalleſt veins opening into the cavity of the inteſtines may be ſo ſtopped up by ropy mucous humours there collected, or by aphthous incruſtations, (ſee § 998) that they can admit of nothing, while in the mean time the exhaling ſmall arteries being not ſo eaſily obſtructed, often continue to pour forth their humours, being urged by the impulſe of the arterial blood, though the venal orifices can at the ſame time admit nothing. In the worſt kind of aphthæ there is almoſt conſtantly ſuch a fatal diarrhœa, and ſometimes it happens in children, whoſe turgid abdomen ſticks out with indigeſted food; and then the diarrhœa is continual, though the bulk of the abdomen does not in the mean time leſſen. Such a diſeaſe ſeems to have been deſcribed by Hippocrates [l], whoſe very words almoſt are to be found likewiſe in Celſus [m], who ſays: *At inteſtinorum lævitas periculoſior eſt, ſi frequens dejectio eſt, ſi venter omnibus horis & cum ſono, & ſine hoc, profluit; ſi ſimiliter noctu & interdiu; ſi, quod excernitur, aut crudum eſt, aut nigrum, &, præter id, etiam læve, & mali odoris; ſi ſitis urget; ſi poſt potionem urina non redditur (quod evenit, quia tunc liquor omnis non in veſicam, ſed*

[l] Prorrhet. Lib. II. cap. 13. [m] Lib. II. cap. 8. pag. 74.

ſed in inteſtina deſcendit); *ſi os exulceratur*, &c. " But a lientery or ſmoothneſs of the inteſtines is " more dangerous, if the ſtools are frequent, and " if there is a flux of the belly or diſcharge by " ſtool every hour, with or without a noiſe or " flatulencies; if the like, which is diſcharged by " day and night, be crude, black or ſhining, and of " an ill ſmell; if the thirſt is urgent; or if after " drinking the urine is not diſcharged, which hap- " pens becauſe then all the liquor deſcends not in- " to the bladder, but into the inteſtines; if the " mouth be ulcerated, *&c.*" Perhaps the ſame akes place when the inteſtines have been ulcerated ıfter a long continued dyſentery, and then theſe arts being cicatrized with a ſcar become imper- pirable, as we ſee in ſcars of the external parts of the body, when the fabrick of the parts has been deſtroyed. But this cauſe of a lientery eems to have been acknowledged by Galen [n], vhen he ſays: *Ex dyſenteria oritur lienteria, uando ex magna ulceratione multæ cicatrices inteſ- inis oboriuntur, propter quas cibos non continent in- eſtina; unde ex inteſtinorum lævitate vocata eſt ienteria. Quamobrem talis eſt inſanabilis lienteria; icatrices namque non ſaneſcunt.* " From a dyſen- " tery ariſes a lientery, when the inteſtines are " beſet with many cicatrices from a large ulcera- " tion, for which reaſon they do not properly re- " tain the food; and hence it is called a lientery " from the ſmoothneſs of the inteſtines; therefore " ſuch a lientery is incurable, for ſcars are not to " be remedied." That a diarrhœa ariſing from n obſtruction of the abſorbing veſſels is danger- ous, appears plainly enough, whence Celſus late- y cited ſubjoins [o]: *Inter quæ cum evidens mors ſit,*

[n] Galeno adſcript. Introductio ſeu Medicus, cap. 13. Char- ar. Tom. II. pag. 385.

[o] Lib. II. cap. 8. pag. 74.

multo evidentior, ſi jam in longinquum quoque id vitium eſt, maximè etiam ſi in corpore ſenili eſt. "Among which lienteries, as death is apparently "the conſequence, it will be ſo, much more evi- "dently if the diſorder is already of long ſtand- "ing, and more eſpecially if it happens in the "body of an old perſon." But when the diſorder ariſes from a ropy mucus and fæces accumulated in young patients, there are more hopes of a cure; for that maſs of foul matter being diſſolved by ſaponaceous medicines, but afterwards evacuated by purgatives, a cure is often performed. Hence perhaps Hippocrates, treating of this diſeaſe, ſays[p]: *Eſt autem hic morbus graviſſimus ſenioribus; vehemens eſt etiam viris. Reliquis autem ætatibus multo minor.* "But this diſorder is moſt obſtinate "and fatal to old people; but it is alſo violent in "men. But in the other lower ages it is much "leſs violent."

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IT is therefore evident that a flux of the bowels in fevers is manifold with reſpect to their matter, cauſe, and their effects and event; and therefore that it is often altogether incurable; that it is ſometimes colliquative, and is then hardly ever curable.

From all that has been ſaid under the preceding aphoriſm it is evident, that a very great variety may take place in this diſeaſe; even though all theſe different ſpecies may be comprehended under

[p] Prorrhet. Lib. II. cap. 13. Charter. Tom. VIII. p. 822.

er the general name of a diarrhœa. Firſt, as to heir

Matter.] For we have ſeen that the healthy nd diſeaſed humours of all thoſe parts which di-ectly empty their fluids into the cavity of the ſto-nach and inteſtines, may afford the matter of a iarrhœa: and moreover, that morbific matter or umours may be derived to the inteſtines by a me-aſtaſis or tranſlation, even from the moſt remote arts of the body. Hence only from the matter vacuated in a diarrhœa, Hippocrates determines nany and various particulars with reſpect to the rognoſis; namely, *Valde aquoſum, aut album, ut ex viridi flaveſcens, aut vehementer rubrum, aut pumoſum dejicere, mala hæc omnia. Malum quo-ue eſt & exiguum, & glutinoſum, & album, & ſub-allidum, & læve. His autem magis lethalia fuerint igra, aut pinguia aut livida, aut æruginoſa, aut nali odoris* [q]. "That all thoſe in which the ſtools "are either very watery, white, of a greeniſh "yellow, intenſely red or frothy, are of bad im-"port. The flux is alſo bad wherein the matter "diſcharged is ſmall in quantity, glutinous, white, "or paliſh, and ſmooth or ſhining. But thoſe "which are black, fat, or oily, livid, or of a dark "green, and of a malignant ſmell, are ſtill more "fatal." The like obſervations he gives us alſo n ſeveral other places. But among others he con-demns evacuations of the ſimple humours ἄκρητα διαχωρήματα; as when a bilious, melancholic, por-raceous, or an eruginous humour flows through the nteſtines without being mixed with a watery hu-nidity, or any thing elſe; as Galen [r] explains this word. For it denotes that ſuch a humour flows mpetuouſly through the inteſtines; and that the

[q] In Prognoſtic. Charter. Tom. VIII. pag. 629. 630.
[r] In Commentar. Aphoriſm. 6, & 23. Sect. VII. Charter. Tom. IX. pag. 294, & 303, & aliis pluribus in locis.

force by which the inteſtines contract and retain their contents, hardly any longer ſubſiſts. For if that force was ſtrong, it would have mixed the affluent humour with the others contained in the cavity of the inteſtines, and therefore would not have permitted them to have been diſcharged by ſtool without mixture.

Cauſe.] We reckoned up three general claſſes of the cauſes of diarrhœas under the preceding aphoriſm; each of which claſſes again comprehend within themſelves a great number of different cauſes. Thus for example, the cauſes expelling the humours into the inteſtines are found very various. When a perſon ariſes warm out of bed and expoſes his body to the cold air, there often follow ſoon after ſlight gripings, and ſometimes a flux, or ſeveral liquid ſtools; becauſe the perſpirable matter being ſuddenly obſtructed run the humours towards the inteſtines. Acrid or corrupt bile in acute diſeaſes, and acid acrimony in young children, and in the weaker adult perſons, are frequently the real cauſe of a diarrhœa. An inflammation of the inteſtines, and the general ways in which that inflammation may terminate, may alſo be the cauſe of a diarrhœa, as will be hereafter made evident. Hence it is ſufficiently apparent how manifold are the cauſes of a diarrhœa.

Effects and event.] For if by a diarrhœa the over abounding quantity of the humours is removed from the body, even though they are healthy, or if offenſive matter is evacuated without weakening the patient's ſtrength, the effects will be good, and the event ſalutary. But the event will be contrary, from a loſs of the healthy and neceſſary juices, or if the patient's ſtrength cannot ſupport a great evacuation. Thus even a diſcharge

of blood by ſtool is ſometimes ſalutary in people who are plethoric; for inſtance, when from having loſt ſome limb, or from a ſuppreſſion of the menſes in women, the redundant quantity of the blood makes its eſcape this way by a dilatation of the anaſtomoſes or mouths of the veſſels. But when the ſame happens from an eroſion of the veſſels, it is often attended with the greateſt danger. Thus it was obſerved in the commentaries to § 594, that ſometimes a critical diarrhœa carried off ſuch parts of the humours in diſeaſes as deviated from the laws of health, or which were not capable of flowing through the veſſels with the reſt of the healthy humours without injuring the functions. But that in the beginning of acute diſeaſes, the matter being not yet concocted, nor diſpoſed for evacuation, a diarrhœa often proves fatal. But in order to determine the different event of a diarrhœa, the patient's ſtrength and habit are to be firſt conſidered, with the nature and time or ſtages of the diſeaſe. For ſtrong bodies of a full habit eaſily ſupport large evacuations, whereas moveable and tender women are greatly diſordered, even by ſlight evacuations. Thus Hippocrates [s] pronounces, *Pleuritide aut Peripneumonia affecto diarrhœam ſuccedere, malum* pronunciavit *Hippocrates.* "A diarrhœa is bad when it happens after a perſon was afflicted with a pleuriſy, or a peripneumony." But, in the aphoriſm next following, he ſays; *Opthalmia laborantem diarrhœa corripi, bonum.* "That for one afflicted with an opthalmia to be taken with a diarrhœa is a good ſign." And in another place [t]; *Si alba pituita detento vehemens diarrhœa ſuccedat, morbum ſolvit*; contra vero *in Phthiſicis lethalem eſſe diarrhœam* monuit. "That if a violent

[s] Aphor. 16, & 17. Sect. VI. Charter. Tom. IX. pag. 256, 257. [t] Aphor. 29. Sect. VII. ibid. pag. 305.

" violent diarrhœa ſucceeds in a perſon afflicted " with white phlegm, it terminates the diſeaſe; " but that on the contrary a diarrhœa is fatal " in conſumptive people [u]." The truth of this might be confirmed, if it was neceſſary, by many obſervations of Hippocrates and others. But that phyſicians may ſafely judge whether or no a diarrhœa will be ſalutary or not, a particular regard ought to be had to that excellent aphoriſm which is of the greateſt uſe in practice. *In alvi perturbationibus & vomitionibus ſponte obortis, ſi quidem, qualia oportet purgari, purgentur, confert & facile ferunt. Sin minus, contra. Sic & vaſorum evacuatio ſi, qualem fieri oportet, fiat, confert & facile ferunt; ſin minus, contra. Inſpicere erga oportet & regionem, & anni tempeſtatem, & ætatem, & morbos, in quibus oportet, (evacuari) vel non.* " In vomitings and purgings ariſing ſpontaneouſly, " If they carry off ſuch humours as ought to be " evacuated, they are uſeful and eaſily tolerable " to the patient. But otherwiſe they are detri- " mental. So likewiſe an evacuation of the veſ- " ſels rightly performed is beneficial, and eaſily " ſupportable, otherwiſe the reverſe; a regard " ought therefore to be had to the country, " ſeaſon of the year, with the nature and age of " the patient and the diſeaſe, in which evacuation " is convenient or not [w]."

And therefore that it is often incurable.] For ſometimes ſuch is the malignity of the matter, and with ſuch great violence does it diſcharge itſelf, that it eludes all the endeavours of art. Hence Hippocrates [x] ſays; *Quibuſcunque morbis incipientibus, ſi bilis atra ſurſum vel deorſum eruperit, lethale.* " In

[u] Aphor. 14. Sect. V. ibid. pag. 202. [w] Aphor. 2. Sect. I. Charter. Tom. IX. pag. 5. [x] Aphor. 22. Sect. IV. ibid. pag. 146.

"In any diſeaſes where atra bilis or black choler is "powerfully evacuated either upward or down-"ward in the beginning, it is a fatal ſign." And in another place; *In febre ardente alvus affatim erumpens, lethale.* "That a copious flux in an "ardent fever is fatal [y]." The fatal event of which ſigns is confirmed by many hiſtories, which he gives us in his books of epidemics. Sometimes alſo a purulent vomica, a malignant ſcirrhus, or even a cancerous tumor, is obſerved in thoſe viſcera which directly evacuate their humours into the inteſtines, as we are taught by medical hiſtory: From whence a corrupt ſanies, or very ſharp and corroding ichor flowing into the inteſtines, excites diarrhœas or dyſenteries incurable by any art: Hence Hippocrates [z] obſerves; *Ex diuturno morbo alvi deductio, malum.* "That a flux of the bowels from a "diſeaſe of long continuance is bad." If now the inteſtines, being perfectly paralytic, let every thing eſcape thro' their cavity, it is evident enough that there are but ſmall hopes of a cure; as alſo when after a long continued dyſentery the inteſtines are ulcerated, and leaving ſcars behind there follows a ſmoothneſs of the inteſtines. For as Hippocrates obſerves, *Poſt longam enim dyſenteriam deſinentem, ſi hydropes, aut lienteriæ fiant, lethale eſt.* "If a "dropſy or a lientery follow after the end of a "long continued dyſentery it is fatal [a]."

That it is ſometimes colliquative, and is then hardly ever curable.] Although in every profuſe or long continued diarrhœa the body is waſted by the great quantity of the fluids exhauſted, yet it is not every flux of the bowels that deſerves to be termed colliquative, though the word is often abuſed

[y] Coac. Prænot. N°. 130. Charter. Tom. VIII. pag. 858.
[z] Aphor. 5. Sect. VIII. Charert. Tom. IX. pag. 343.
[a] In Coac. Prænot. N°. 466. Charter. Tom. VIII. pag. 879.

ſed by the ignorant and the boaſter, for the term Συντήκεσθαι, which properly denotes to melt down or waſte away, is ſometimes uſed in a leſs proper ſenſe, as Galen [b] obſerves, when the body falls away in diſeaſes. But a colliquative flux of the bowels is properly intended, when after long continued diſeaſes, and eſpecially after a ſuppuration of the viſcera, or a dropſy of long ſtanding, the humours are diſſolved into a putrid liquor, and evacuated by ſtool. This is that kind of diarrhœa which uſually puts a period to the life of a patient waſted by a pulmonary conſumption, as Hippocrates [c] obſerves in ſeveral places. The like flux alſo happens towards the latter part of the life of a dropſical patient, when the waters being corrupted by a long ſtagnation putrefy the viſcera to which they flow; and then the unhappy patient often conceives hopes of a cure from the diſcharge, when even death is at hand. Hippocrates therefore very prudently obſerves, that a watery diarrhœa is ſerviceable in dropſies, but then it muſt be only in the beginning of the diſeaſe, as we obſerved before at § 719. Since therefore a colliquative flux is rarely obſerved but in ſuch deſperate caſes, it is evidently enough not frequent, and hardly ever curable.

[b] In Comment. Aphor. 28. Sect. II. Charter. Tom. IX. pag. 70. [c] Aphor. 12. & 14. Sect. V. Charter. Tom. IX. pag. 201, 202. Coac. Prænot. N°. 634. Charter. Tom. VIII. pag. 890.

SECT.

SECT. DCCXXI.

IF the diarrhœa continues a long time, it diſpoſes the abdominal viſcera more and more to the ſame diſeaſe, weakens, excoriates, or inflames them, drains and forces out the humours from the other veſſels and viſcera; hence an atrophy, leanneſs, and weakneſs of the body, an inſpiſſation of the fluids throughout the whole habit, a laxity of the ſolids, a loſs of the fluids, a leucophlegmacy, dropſy, and tabes or conſumption of the whole habit.

We come now to treat of the effects of a diarrhœa, and from thence to determine the prognoſis, or what diſorders are to be thence feared. From what we ſaid before, it appears that by a diarrhœa offenſive humours are often evacuated from the body; and that ſometimes the too great abundance of the healthy humours is thus leſſened; whence in ſuch caſes a diarrhœa may be uſeful. But when the offenſive abounding humours have been thus evacuated from the body, if the diarrhœa continues any longer it will be miſchievous, and hence Hippocrates [d] abſolutely condemns long continued diarrhœas, whether of the crude aliments, bilious, or phlegmatic; nor would he have a diarrhœa continue longer than ſeven days, but adviſes to reſtrain them by a ſuitable diet and convenient medicines, varied according to the ſeveral kinds of the diſeaſe. All which has been fairly collected together from Hippocrates by Celſus [e], when he ſays,

Sed

[d] Prorrhet. Lib. II. cap. 4. Charter. Tom. VIII. pag. 813.
[e] Lib. IV. cap. 19. pag. 222.

Sed uno die fluere alvum ſæpe pro valetudine eſt; atque etiam pluribus, dum febris abſit, & intra ſeptimum diem id conquieſcat. Purgatur enim corpus, & quod intus læſurum erat, utiliter effunditur. Verum ſpatium periculoſum eſt, interdum enim tormina & febriculas excitat. "But for a flux of the bowels "to continue for a day is often ſalutary; as it alſo "is when it continues ſeveral days when the fe- "ver is off, and if it ſtops within ſeven days, for "the body is thus purged or cleanſed, and the "injurious matter lodged therein is thus happily "evacuated. But long continuance of the diſeaſe "is dangerous, for it ſometimes occaſions gripes "and ſlight or hectical fevers."

Therefore if the flux continues long it inclines the abdominal viſcera more and more to the ſame diſorder, and weakens them.] For by the continual afflux of great quantities of the humours the internal ſurface of the inteſtines is macerated, the mouths alſo of the arteries and excretory ducts of the viſcera are likewiſe relaxed, and therefore they will leſs reſiſt the impulſe of the humours, and more eaſily tranſmit them; and thus by degrees the body will be habituated to ſend a great quantity of juices to theſe parts, and at the ſame time the other excretions by the bladder and inſenſible perſpiration will be leſſened; from thence will ariſe the greateſt difficulty of the cure, ſince it is often found ſo hard a taſk to reſtore the weakened veſſels and viſcera to their former ſtrength. Thus I have ſeen diarrhœas ariſing from an ill diet in poor people, which being neglected in the beginning have continued for years incurable by all the methods undertaken, and this even though there were no ſigns of a corruption in the viſcera, or of a latent vomica in any part of the body, but the obſtinacy of the diſeaſe ſeemed to proceed only from the lax

and weak ſtate of the inteſtines and abdominal viſcera.

Excoriates and inflames them.] It appears from anatomy that the internal ſurface of the inteſtines is covered with a nap or pile, conſiſting of the prominent extremities of the ſmall arteries and veins, whence their internal membrane is ſaid to be villous or downy. But theſe tender and pulp-like extremities of the ſmall veſſels, as alſo the prominent nervous papillæ are anointed with a ſoft mucus diſcharged from the adjacent follicles or cells, and by that means they are defended from the acrimony or roughneſs of the ingeſted food paſſing over them. If therefore theſe tender parts are deprived of their defending mucus by a long continued diarrhœa, it is evident enough that pain and inflammation muſt frequently enſue. But alſo the pulpy ſubſtance of the inteſtines themſelves, being macerated in a great quantity of humours flowing hither, or being corroded by their acrimony, is ſometimes diſſolved, and appears in the ſtools like lacerated membranes. For although the mucus only of theſe parts being abraded, may deceive one under this appearance, yet obſervations teach us, that even ſometimes the ſubſtance itſelf of the inteſtines is thus abraded. Theſe are the ξύσματα, ramenta or ſhavings, as they are called by Hippocrates [f], the appearance of which in the ſtools he juſtly condemns, when he ſays; *Et quibus dejectiones, ſi reſidere permiſeris, neque moveris, veluti ramenta ſubſident: Et ſi pauca ſunt, parvus eſt morbus, ſi multa, magnus.* "And in thoſe liquid ſtools which being permitted to ſtand without ſhaking, depoſit a kind of fleecy ſhavings; if theſe are little in quantity the diſeaſe is ſmall; if much, the diſeaſe is great." Galen [g] teſtifies

[f] Aphor. 67. Sect. VII. Charter. Tom. IX. pag. 331.
[g] De uſu partium, Lib. IV. cap. 17. Chart. Tom. IV. p. 390.

teſtifies that he has ſeen many, who being afflicted with violent and long continued diſeaſes have thus had a great part of the inteſtines corrupted, and in many places their internal coat entirely deſtroyed, more eſpecially in dyſenteries. And when once ſmooth cicatrices are formed from ſuch a cauſe deſtroying the abſorbing veins, it ſeems ſometimes to produce an incurable lientery. Nor is the internal coat of the inteſtines ſeparated and diſcharged only under the appearance of fleecy threads and ſhavings, but ſometimes a great part of it is expelled under the form of a membrane, as we are aſſured from medical obſervations; in confirmation of which it may be ſufficient for us to alledge only one inſtance of a perſon, afflicted with excruciating pain of the bowels, with ſuch an ulceration of the inteſtines, that he entirely diſcharged the whole membrane which lines the rectum. Nor did he immediately diſcharge this membrane all at once, for by its firmly adhering to the orifice of the anus, it afforded an extraordinary ſpectacle, and could not be perfectly ſeparated from thence in leſs than two days time [h].

Drains and forces out the humours from the other veſſels and viſcera.] For although ſometimes by a diarrhœa in the beginning of the diſeaſe, ſuperfluous or offending humours are expelled, yet if that expulſion continues, the good and neceſſary fluids will be exhauſted from the body; and at the ſame time the ingeſted aliments will be diſcharged by ſtool, before chyle can be prepared and abſorbed from them, to ſupply the deficiency of thoſe juices which are daily deſtroyed by the actions of life and health. Thus the quantity of the juices will be leſſened and drained, or forced from the other veſſels and viſcera of the body. For

[h] Tulpii obſerv. Medic. Lib. II. cap. 17. pag. 207.

For this reaſon Hippocrates [i] ſays; *Mulieri uterum gerenti, ſi alvus multoties profluat, abortus periculum eſt.* "There is danger of a miſcar-"riage from a frequent diarrhœa in a woman "with child. Becauſe the veſſels being thus ex-"hauſted, there are not juices enough in the "mother to ſupport two bodies [k]."

Hence an atrophy, weakneſs and leanneſs of the body.] For then thoſe juices are drained from the body, which ought to repair what is conſumed, whence the nutrition will be defective. And as the reſt of the humours become more acrid for want of new chyle, the fat will be diſſolved, and mixing with the circulating humours will allay their acrimony for a time, but will afterwards be evacuated together with them by ſtool, whence leanneſs will follow; for it is well known that people are emaciated by frequent evacuations by ſtool. Hence alſo Galen [l] recommends continual purging of the bowels for the cure of over-fatneſs. But that weakneſs will ariſe from an emptineſs of the veſſels exhauſted of their fluids, we demonſtrated before in the comment to § 661. But weakneſs in a diarrhœa is by Hippocrates derived not only from inanition, but from the fatigue which the patient is obliged to undergo in the frequent diſcharges, nor is he able to ſleep, though he diſcharges but little at a time: for his words [m] are the following: *Verum ſi alvi excrementum liquidum eſt, expedit nec ſtridere, nec crebro & pauculum quid excerni: Feſſus enim homo ex continua exſurrectione in-*

[i] Hippocr. Aphor. 34. Sect. V. Charter. Tom. IX. p. 214.
[k] Celſ. Lib. II. cap. 10. pag. 72.
[l] De ſanitate tuenda, Lib. VI. cap. 8. Charter. Tom. VI. pag. 175.
[m] In prognoſticis, Charter. Tom. VIII. pag. 627.

inſomnis fit, ſi vero affatim ſæpe dejiciat, periculum eſt ne in animi deliquium incidat. "But if the inteſtinal "fæces are liquid, 'tis beſt if a very ſmall quantity "is diſcharged at a time, neither frequently nor "with a noiſe; for the patient, being fatigued, is "robbed of his ſleep by a continual riſing up; "but if he diſcharges a great quantity at once, "there is danger of his falling into fainting fits."

Dyſentery.] Which properly denotes no more than a diſorder of the inteſtines; whence ſometimes follows a troubleſome diarrhœa and gripes, and a frequent teneſmus or fruitleſs endeavour to go to ſtool, with a ſharp pain, which is then uſually called a dyſentery. But becauſe a diarrhœa uſually follows a dyſentery, when the ineſtines, being excoriated or inflamed, are in ſevere pain, by the long continued flux; or elſe are corroded and ulcerated by the ſharp preying humours; and as then for the moſt part the mucus of the inteſtines is abraded, and is uſually diſcharged together with ſome ſtreaks of blood (from the veſſels, being now naked, and in a manner rubbed off, commonly diſcharged by ſtool with a frequent and troubleſome teneſmus;) hence a bloody flux of the bowels is by ſome phyſicians judged only to be intended properly by the term dyſentery. This opinion is favoured by the deſcription of Celſus; for, what the Greeks call a dyſentery, he terms the gripes [n], and deſcribes it as follows: "*Intus inteſtina exulcerantur: ex his cruro manat, iſque modo cum ſtercore aliquo ſemper liquido, modo cum quibuſdam quaſi mucoſis excernitur; interdum ſimul quædam carnoſa deſcendunt. Frequens dejiciendi cupiditas, dolorque in ano eſt. Cum eodem dolore exiguum aliquid emittitur: atque eo quoque tormentum intenditur*, &c. "Internally the inteſtines are ulcerated, from whence "blood

[n] Celſus, Lib. IV. cap. 15. pag. 224.

" whence blood iſſues, and is diſcharged in ſome " manner with liquid excrements always, and " ſometimes there is diſcharged a ſort of mucus, " ſometimes likewiſe a ſort of fleſhy ſubſtance " deſcends from the bowels. There is a frequent " deſire to go to ſtool, and a pain in the anus, with " the ſame pain there is very little of any thing " diſcharged, and then the torture is proportion- " ably more increaſed, &c." For although Galen [o] erms an ulceration of the inteſtines a dyſentery, nd denies that it is preſent, when ſharp corroding umours are diſcharged by ſtool, before the inteſ- ines are ulcerated; yet he calls a flux of blood rom the inteſtines without an ulceration by the ame of a bloody dyſentery [p]: and by the ſame ame he alſo calls that flux of blood by ſtool, hich happens in thoſe who have ſuffered an am- utation of any of the limbs, or are become ple- horic from neglecting wonted exerciſes [q]. But it ould ſeem that ſuch a diſcharge of blood may be etter referred to a diarrhœa, as we obſerved be- re at § 719, ſince it is often obſerved without ny teneſmus or gripings. A diſcharge therefore f blood is with leſs propriety eſteemed a pathog- omonic ſign of a dyſentery, ſince therein we ob- rve bilious, mucous, and atrabiliary matter diſ- harged by ſtool with a troubleſome teneſmus and iolent gripings, and therefore the troubleſome ain and frequent teneſmus is much better uſed as ſign to diſtinguiſh a dyſentery from a diarrhœa, hether from an ulceration of the inteſtines, or om their being excoriated and inflamed from an raſion of their mucus; which opinion is alſo fa-

[o] Commentar. 2. in Lib. II. Epidem. Charter. Tom. IX. g. 138. & pluribus aliis in locis.

[p] In Comment. Aphor. 65. Sect. V. Charter. Tom. IX. g. 240.

[q] Comment. 4. in Hippocrat. de articulis, Charter. Tom. II. pag. 450.

voured by the ſtrict ſenſe of this term, as it literally ſignifies an ill ſtate of the inteſtines. But from what has been ſaid the reaſon is ſufficiently evident, why after a long continued diarrhœa follows a dyſentery, according to the obſervation of Hippocrates[r].

An inſpiſſation of the fluids throughout the whole habit.] For by a long continued flux of the bowels the moſt liquid parts of the blood are exhauſted, and therefore what remains, however ſmall in quantity, will yet be rendered thick and impervious. Nor is it any objection to this that we before recommended a flux of the bowels, or the procuring an artificial diarrhœa in the cure of an inflammation, which is performed by a reſolution of the thick inflammatory matter. For in that caſe purges were uſed to diminiſh the impetus of the blood, and leſſen the quantity of the humours, (§ 396. N°. 2, 3.) or to make a revulſion of the impetus from the inflamed towards ſome other parts (§ 396. N°. 4); and thus at the ſame time the elaſtic vibrations of the veſſels were reſtored, by leſſening the quantity of the diſtending liquid, (§ 398. N°. 1.) Add to this, that at that time ſuch purges were choſen as had a conſiderable power in diſſolving the blood, as well as in evacuating the humours by ſtool. It is indeed true that the humours are diſſolved and fuſed when a diarrhœa attends, but then all that is diſſolved eſcapes by ſtool; and therefore what remains being deprived of its diluent vehicle, muſt be very much inclined to produce obſtructions and inflammations. Hence the reaſon is evident why Hippocrates[s] (though he obſerves in one place that a diarrhœa is uſeful to one afflicted with an inflammation of the eyes, yet he) obſerves[t] in another pla

[r] Aphor. 75. Sect. VII. Charter. Tom. IX. pag. 336.
[s] Aphor. 17. Sect. VI. Charter. Tom. IX. pag. 257.
[t] In Coacis Prænot. N°. 220. Charter. Tom. VIII. p. 8

place, *Oculorum rubedinem in febre* (ἐν πυρετῷ, alii legerunt ἀπυρετῷ sine febre) *ortam diuturnam alvi malignitatem significare*; "That a redness of the "eyes in a fever denotes the malignity of a long "continued diarrhœa;" as also, *Rubores circa naſum alvi humeſcentis ſigna eſſe.* "That redness "about the nose is a sign of a moist state of the "bowels[u]." For the same reason in a long continued lientery, *Rubet facies, & quaſi maculis quibuſdam omnium colorum diſtinguitur.* "The face "looks red, and is as it were marked with spots "almost of every colour[w]." It is therefore no wonder in desperate consumptions, if after a colliquative diarrhœa, there are inflammatory pustules arise in the face, and a quinsy affects the fauces, &c. The same is likewise frequently observed in inveterate dropsies, when all the water escapes from the vessels, and is collected in the cavities of the body, and only the red parts of the blood are left in a small quantity, but thick and impervious, hesitating about the extremities of the arteries.

A laxity of the solids, and a loss of the fluids.] Since a diarrhœa is a frequent discharge of stools more than usually liquid, it must evidently occasion a waste of the fluids. But a laxity of the solid parts also follows from a long continued diarrhœa, not only in the intestines, but likewise throughout the whole body. For it was demonstrated at § 25, that the solid fibres of our bodies became too lax, when the assimilation of the ingested aliments into the nature of our healthy fluids is impeded, because from these thus altered, those parts ought to be restored which have been wasted both from the solids and fluids by the actions of life. Also from what was said in that place it appeared

[u] Coac. Prænot. N°. 216. ibid.

[w] Cels. Lib. II. cap. 8. pag. 74. Hippocr. Prorrhetic. Lib. II. cap. 13. Charter. Tom. VIII. pag. 822.

peared that too great a loſs of the healthy humours impeded the aſſimilation of the ingeſted aliments. Since therefore by a long continued diarrhœa there is a great loſs of the fluids, and the ingeſted aliments are alſo expelled by ſtool, before a due quantity of chyle has been prepared and abſorbed from them; it is therefore very apparent that a laxity of the ſolids is juſtly ranked among the effects of a long continued diarrhœa.

Leucophlegmacy, dropſy, tabes or conſumption of the whole habit.] All theſe diſorders may follow from too great a laxity of the ſolid parts produced from a long continued diarrhœa, as is evident from what has been ſaid in the comment to § 44. N°. 2. For although it may ſeem wonderful at the firſt view, that the body ſhould ſwell with accumulated water, when at the ſame time the moſt fluid parts are continually exhauſted by a diarrhœa, yet this is nevertheleſs true. For generally intenſe thirſt is uſed to accompany a profuſe diarrhœa: and tho' the ingeſted drink eſcapes for the moſt part by ſtool, yet ſome part of it is abſorbed, and from the weakened coheſion of the ſolids is depoſited in the cavity of the thorax or abdomen, ſo as to produce a dropſy: or if it is collected throughout the whole habit in the paniculus adipoſus, it produces a leucophlegmacy. Hence ſays Hippocrates[x]: *A Dyſenteria Lienteria, a Lienteria Hydrops.* "From a dyſentery "follows a lientery, and from a lientery a drop"ſy." Moreover, when the diarrhœa ceaſes after it has continued a long time, the body relaxed and weakened ſoon ſwells and becomes dropſical from the watery liquors taken in. But ſince in a diarrhœa for the moſt part thoſe juices are evacuated which ought to nouriſh the body, and as the

[x] De Morbis, cap. 2. Charter. Tom. VII. pag. 533.

the assimilating powers are deficient from the loss of the fluids, and the laxity of the solids, therefore the nutrition will be likewise defective, and the body will waste away. For the same is true in this case, which Celsus[y] has observed concerning the abuse of purges: *Assuescit enim non alii corpus; & ob hoc infirmum erit: cum omnibus morbis obnoxia maxime infirmitas sit.* "That the body falls into "a habit of being not nourished, and from thence "will be infirm, since weakness is the most obnoxi-"ous to all manner of diseases." This effect of a long continued diarrhœa is also confirmed in the Coan Prognostics of Hippocrates,[z] where he says; *Lienteriæ cum spirandi difficultate & lateris morsu, in tabem desinunt.* "That lienteries, attended with "a difficulty of breathing and a pain in the side, "end in a consumption."

Having thus premised every thing that belongs to the matter, causes, diagnosis and prognosis of a diarrhœa, it remains for us to treat of its cure as a febrile symptom.

[y] Lib. I. cap. 3. pag. 31.
[z] N°. 469. Charter. Tom. VIII. pag. 879.

SECT. DCCXXII.

THE cure is performed by mitigating the irritating acrimony; by an expulsion of it with vomits, purges, and clysters; by corroborating the relaxed vessels, by quieting the impetus of the humours with narcotics, and by directing them another way by sweat or urine; by evacuating the morbific matter, and by correcting its first source or spring.

It must first of all be inquired, whether a diarrhœa is to be removed or not. For, as we said before, sometimes foul diseased humours are evacuated by a flux from the intestines, and sometimes the too great redundancy of healthy humours is thus removed; but, by what signs this may be distinguished, we likewise remarked before. Therefore as Trallianus[a] well observes: *Quare initio ea, quæ corporis commodo atque utiliter excernuntur, reprimere minime convenit*, &c. *Ubi vero diuturnior alvi fluxus fuerit, non tantum superflua evacuans, sed etiam habitum colliquans, & vires consumens, tunc sane & medicamentis resistere convenit.* "That it is not in the least convenient to "suppress those matters, the discharge of which is "commodious and useful to the body, &c. but "when the flux has been of long standing, so as "not only to evacuate the superfluities, but likewise to exhaust the habit, and waste the strength, "then indeed it will be proper to oppose it by medicines." He also testifies, that he had observed an unseasonable suppression of a diarrhœa in fevers to have thrown the patient into great danger, so as

[a] Lib. VIII. cap. 7. pag. 423, 424.

as to affect them either with a phrenzy or lethargy, or else with pains of the head, attended with troublesome parotids or swellings under the ears. It is only by a careful observation of diseases, and an attention to these particulars, that a physician can discover whether a flux of the bowels will be serviceable or not, as we said more at large in the history of fevers in general, and concerning which we shall speak more particularly when we come to treat of epidemical diseases.

But since the general causes of a diarrhœa enumerated at § 719, are different one from another, and depend on very different circumstances; it is therefore sufficiently evident that no universal method can be delivered for the cure of a diarrhœa, whose treatment ought to be varied according to the different causes. But all these various methods may be commodiously reduced to those enumerated in the present aphorism.

By mitigating the irritating acrimony.] But this may be obtained either by such remedies as dilute, involve, sheath and entangle all acrimony, so as to render it unactive: or by such things as, by their opposite nature to the known acrimony, can obtund or weaken it. To the former indication serve chiefly diluents; for by them the most acrid matter of any kind may be rendered unactive. (See § 605. N°. 6.) It is indeed true that a diarrhœa is often increased during the time that the intestines are overflowed by the plentiful drinking of diluent liquors; but at the same time the acrid irritating matter is mitigated and washed out, and this being performed the disorder will cease in a short time, or else may be easily removed by the use of opiate and corroborating medicines. In the cholera morbus, where there is a profuse evacuation both upward and downward, Syden-

ham[f] gave a broth made of the tender fleſh of chickens, but ſo thin and dilute, that it had hardly any taſte of the fleſh; or in defect of that he gave any other ſoft diluent liquor: of the ſame liquors he ordered frequent clyſters to be injected by the anus, with the view of waſhing out from the body ſo ſharp a ſtimulus by a large quantity of diluent liquors, or at leaſt that thus its acrimony might be greatly weakened. Hippocrates[g] ſeems to have pointed out this method in treating of a flux of the bowels: for thus he expreſſes himſelf; *At vero alia alvi profluvia, quæ ſine febre ſunt, & brevi tempore durant, & boni moris ſunt: aut enim eluta ſedabuntur, aut ſua ſponte.* "But in other "fluxes of the bowels, which are without a fever, "of ſhort duration and good condition, they will "be either quieted by diluting, or elſe ceaſe ſpon-"taneouſly." But in this caſe water is the only diluent, to which various things are uſually added, according to the different nature of the irritating acrimony. Thus if a too viſcid or acrid bile, or a rancid oily matter adhering to the inteſtines, is the cauſe of the diarrhœa, ſaponaceous ſubſtances are added to the watery liquors, ſuch as honey, jelly of elderberries, currants, *&c.* becauſe we know that in ſuch a caſe a dilution cannot be eaſily obtained by water only. Such things as ſheath, entangle, or inviſcate, are ſerviceable two ways; for they not only mitigate and render the acrid humours unactive, with which they mix themſelves, but at the ſame time they line and defend the internal ſurface of the inteſtines, ſo that they are leſs liable to be injured and irritated by the acrimony. For this reaſon the emollients are added to the diluent water, ſuch as comfrey, mallows, marſh-

[f] Sect. IV. cap. 2. pag. 217. &c.

[g] Prorrhetic. Lib. II. cap. 13. Charter. Tom. VIII. pag. 822.

marſhmallows, mullen, &c. both leaves, flowers, and roots, with oats, barley, millet, and the like; the ſweeteſt and ſofteſt expreſſed oils drank, and injected by way of clyſter, are ſerviceable in the ſame manner: but as theſe very eaſily turn rancid by the increaſed heat in fevers, therefore emulſions prepared from the oily ſeeds and fruits themſelves are ſometimes juſtly preferred. For this reaſon Hippocrates [h] ſays in the cure of a dyſentery; *Et ſiquidem febris expers fuerit, unguinoſis, pinguibus, dulcibus & liquidis alvo contenta ſemper educere oportet.* "That if it is without a fever, the inteſtinal "contents ought always to be waſhed out by unc-"tuous, fat, or oily, and ſweet liquors." In very painful dyſenteric excretions Galen [i] recommends goats fat or cerate of roſes. White wax melted and taken in warm milk, we are told, was of great uſe in a camp-dyſentery [k]. The like effects are alſo uſually expected from the medicinal earths of the ſhops, as terra ſigillata, bole armeniac, and the like, if taken in a ſufficient large quantity; for by their mild ſoftneſs they allay all ſorts of acrimony, and at the ſame time corroborate and obtund any latent acid, or at leaſt ſo cover and ſheath it as to prevent any further irritation, while they reſiſt all putrefaction: hence alſo they have a great name in the cure of diarrhœas and dyſenteries, concerning which ſee what has been ſaid in the comment to § 88. N°. 5. But ſince all diluent, emollient, and oily ſubſtances relax and weaken, it is evident that they muſt be prejudicial, where a diarrhœa ariſes from too great a laxity in the fibres of the inteſtines, and that they only are of uſe where the irritating acrid can be mitigated by them.

All

[h] De affectionibus, cap. 7. Charter. Tom. VII. pag. 627.
[i] Comment. 2. in Lib. 2. Epidemic. Charter. Tom. IX. pag. 138.
[k] Degnerus de Dyſenteria, &c. cap. 3. § 88. pag. 149.

All theſe are capable of mitigating acrimony almoſt of any kind: But when the particular kind or nature of the irritating acrimony appears, ſuch things will be alſo ſerviceable as have an oppoſite force. Thus when a diarrhœa attends in young children with acid belchings, and green ſtools ſmelling ſour, it is plain that the irritating acrimony is an acid; and the earthy abſorbents, as crabs eyes, coral, calcined hartſhorn, or the burnt bones of animals, *&c.* are ſo happily of uſe, that many have believed them univerſal remedies in all diarrhœas, but without foundation; ſince they have no action at all where a putrid alcaline acrimony occaſions the diſeaſe, which however is fairly cured by acids. But, in what manner the different known kinds of acrimony are to be cured, we ſaid before in the comment to § 605. But it is evident that great caution is neceſſary, firſt rightly to diſcover the nature of the irritating acrid, ſince an error of fatal conſequence may be committed in this reſpect. But when ſuch caſes occur, wherein the nature of the ſtimulus does not evidently appear, diluents and emollients only can be uſed with ſafety to weaken the ſtimulus.

By an expulſion of it with vomits, purges, and clyſters.] The moſt ſpeedy cure of a diarrhœa will be obtained, when that, which by its ſtimulus produced the diſeaſe, can be evacuated upward and downward: For it is a work of much longer time to mitigate the irritating acrimony than to expel it, when that can be ſafely performed. This method is confirmed by a careful attendance to nature in the cure of diſeaſes. For by the diarrhœa itſelf, when it ariſes from an acrid irritating ſtimulus, nature endeavours to evacuate that which is the cauſe of the diſeaſe; and hence ſo often the matter of the diſeaſe being diſcharged by ſtool, the

diarrhœa ceaſes ſpontaneouſly. But when this matter is either too copious or tough, art aſſiſts nature by attempting to evacuate that upward or downward, which being longer retained would make the diſeaſe of long continuance. But altho' in a diarrhœa all the humours flow almoſt ſpontaneouſly towards the inteſtines, ſo that there ſeems to be an open way to aſſiſt this endeavour of nature by the uſe of purges; yet practical obſervations teach us that frequently a diarrhœa and dyſentery are the moſt happily cured by vomits; whether this is brought about by an evacuation of the matter upward which lodged about the ſtomach and ſuperior inteſtines, producing an irritation by the continual ſtimulus in the inteſtines, yet without being readily propelled towards the anus; or whether the irritating matter hitherto lying fixed is rendered moveable by the violent concuſſions of the abdominal viſcera in vomiting; or laſtly, the motion of the inteſtines may be inverted by vomiting, by which hitherto all the inteſtinal contents were ſwiftly hurried towards the anus. The firſt effect of vomiting ſeems to be proved by what Degnerus [l] obſerved in a very bad kind of epidemical dyſentery: namely, that it was a good ſign if the patient diſcharged yellow bile, and ſtill better if green bile was expelled at any time of the diſeaſe; but more eſpecially in the beginning, by vomiting or ſtools, either ſpontaneouſly, or by the uſe of medicines; the whole malignity of the diſeaſe being thus evacuated at one and the ſame time: But the patients recovered ſo much the more certainly as this evacuation happened ſooner. The ſecond effect of vomiting is fairly proved by what Sydenham [m] has obſerved in the cure of fevers; namely, that in a continual

[l] Degnerus de Dyſenteria, &c. pag. 21.
[m] Sect. I. cap. 4. pag. 63, &c.

continual epidemic fever that ſpread, among other ſymptoms there was a vomiting, or ſometimes a fruitleſs endeavour to vomit; but yet the morbific matter could not be thus expelled, but required a vomit to be given, that being rendered moveable by the violent concuſſions in ſtraining to vomit, it might be afterwards evacuated; for unleſs it could be thus diſcharged a profuſe diarrhœa enſued in the progreſs of the fever, often very dangerous, when the patient's ſtrength was exhauſted, or infringed by the diſeaſe; and yet to cure this diſorder in whatever time of the diſeaſe it appeared, he found nothing more efficacious than a vomit, provided the patient's ſtrength was yet firm enough to bear it. But Sydenham teſtifies that he has often wondered to find the matter diſcharged by vomiting, neither conſiderable in quantity, nor poſſeſſed of any remarkable bad qualities. But, as Hippocrates obſerves[n], *Quæ prodeunt, haud multitudine æſtimanda ſunt, ſed quamdiu prodeant, qualia oportet, & æger facile ferat.* "We are not to eſtimate the uſefulneſs of evacuations from their quantity, but from their continuing a long time in their due condition, and being eaſily tolerable to the patient." The third and laſt effect of vomiting, where the motion of the inteſtines accelerated downward is diminiſhed or inverted upward, ſeems alſo to be confirmed by practical obſervations. Hippocrates[o] remarks, *Quod, longa diarrhœa detento ſponta-neus ſuccedens vomitus diarrhœam ſolvit.* "That a ſpontaneous vomiting ſucceeding in a patient who has been long afflicted by a diarrhœa, terminates the flux." Nor yet does it ſeem that this effect ought always to be aſcribed to the evacuation of the irritating matter; for in another place

[n] De Humoribus Charter. Tom. VIII. pag. 546.
[o] Aphor. 15. Sect. VI. Charter. Tom. IX. pag. 225.

place he has the following paſſage[p]: *Alvum autem coactam vomitio ſolvit, & plus æquo fluentem ſiſtit: illam quidem humectando; hanc vero ſiccando. Quum igitur quis alvum celerrimè ſiſtere volet, devoratum cibum, priuſquam humeſcat, & deorſum detrahatur, evomere oportet*, &c. "But a vomiting removes "a coſtiveneſs of the bowels, and likewiſe reſtrains "too great a flux of them, by moiſtening in the "firſt place, and by drying in the latter. When "therefore any one would ſpeedily ſtop a flux, he "ought to vomit up the food ſwallowed, before it "is moiſtened, or carried downward, *&c.*" The like is alſo to be found in Celſus[q]. I remember myſelf to have ſeveral times uſed aſtringents and other remedies without ſucceſs for the cure of long continued diarrhœas, whereas a vomit being given in the morning for three days together has removed the diſorder, though there were no ſigns teaching that any thing was lodged about the firſt paſſages, which by its ſtimulus might cauſe a flux. Even it happens, though rarely, that the diſeaſe is ſo obſtinate that thus alſo it will not give way, but I have been obliged to give a vomit every day three or four times more, and with happy ſucceſs; but obſerving to give an opiate in the evening after the operation of the vomit was over.

From theſe effects the root ipecacuanha ſeems to have gained ſuch reputation as a ſpecific remedy in all diarrhœas and dyſenteries, though any kind of vomit will produce the like effects. But ipecacuanha is juſtly the moſt in uſe, becauſe it does not excite ſuch diſturbances in the body as antimonial vomits, and may be ſafely given, even to infants.

But

[p] De victus ratione ſanorum, Lib. II. cap. 10 Charter. Tom. VI. pag. 473.

[q] Lib. I. cap. 3. pag. 32.

But purgatives are likewiſe often uſed with ſucceſs to expel the ſtimulus, namely, when the irritating matter lies rather in the inteſtines, or about the ſtomach; and if there is neither ſickneſs or inclination to vomit attending the fever. But then it is uſual to chuſe ſuch as have a manifeſt aſtringency joined with their purgative force, ſo as to leave the bowels ſtrict or conſtipated after their purgative operation is finiſhed in healthy people. Hence the ſeveral kinds of rhubarb, *&c.* have juſtly merited ſo much praiſe in the cure of a diarrhœa. But clyſters take place here, inaſmuch as they waſh out the irritating matter from the large inteſtines, where this matter may likewiſe heſitate; or inaſmuch as the purgative remedies injected with a clyſter may produce their proper effects. For it is well known by daily obſervation in practice, that purgatives injected in a quadruple doſe by the anus, and retained a long time, operate in the ſame manner as if a ſingle doſe had been taken by the mouth. Theſe are more eſpecially of uſe in young people, and in others who have an averſion to theſe nauſeous purgatives, or immediately vomit them up again as ſoon as taken. But when clyſters are uſed for this purpoſe in adults, they ought not to exceed the quantity of three or four ounces; and ſo proportionably leſs in thoſe who are younger, leſt, irritating the inteſtines by their weight, they ſhould be ſuddenly expelled again by ſtool. It is alſo preferable, firſt to waſh out the large inteſtines by injecting a clyſter made of honey and water, that afterwards the purging clyſter may be better retained and abſorbed by the bibulous veins of the inteſtines.

But all theſe only take place when there are hopes of this way expelling the irritating matter, the viſcera

viſcera being ſound and healthy, that they may be capable of bearing the action of theſe medicines. For if, for example, the liver is waſted in chronical diſeaſes, or eat up by a purulent vomica, the ſhocks of the abdomen in vomiting may rend or break this friable viſcus, whence a very bad overpurging, faintings, and death itſelf may be feared. Hence alſo this method proves ſo often fatal in the event, when purges or vomits are repeated while there is an inflammation of the inteſtines; for we have before obſerved that a diarrhœa and dyſentery are ſometimes produced from ſuch an inflammation. For Sydenham [r] obſerves in a ſort of continual fever (which ſpread at the ſame time when the ſmallpox was epidemical) of the inflammatory kind, that there was a diarrhœa attending; and moreover at the ſame time there was a diarrhœa which ſpread epidemically without any manifeſt ſigns of a fever [s]. But that phyſician being moſt acute in diſtinguiſhing the nature of diſeaſes, found, *Illa diarrhœa ortum ſuum deberet radiis inflammatoriis in inteſtina verſis, atque eadem ad hanc expulſionem ſollicitantibus; cum interim ſanguinis maſſa, ope hujus diverticuli a malis, quos aliter radii iſti attuleſſent, effectibus integra maneret atque illæſa, nullo febris viſibili ſigno exterius ſe prodente.* "That the "diarrhœa owed its origin to the inflammatory "rays directed towards the inteſtines, and ſollicit-"ing an expulſion that way; when in the mean "time the maſs of blood by means of this "drain continued ſound and uninjured from the "effects which thoſe rays would otherwiſe have "brought, while no viſible ſign of a fever ſhewed "itſelf externally." This kind of diarrhœa he readily cured by bleeding, with a cooling regimen of diet and medicines. But if the cure was attempted

[r] Sect. III. cap. 3. pag. 207, [s] Ibid. pag. 209.

tempted with rhubarb, or other mild and aſtringent cathartics, the diſorder ſlight in its own nature often became deſtructive. It is therefore evident how much caution is neceſſary to obtain the knowledge of the cauſe of a diarrhœa, before one ſets about the cure.

It is moreover to be remarked that one doſe of a purge or vomit is not ſufficient to expel the irritating matter, but ſometimes it is neceſſary to repeat the ſame oftener. Thus Sydenham in the cure of a dyſentery gave a purge every other day to the third time [t].

By corroborating the relaxed veſſels or ducts.] Namely, when a diarrhœa derives its origin from a weakneſs and laxity of the inteſtines, or when the irritating ſtimulus being expelled, too great a laxity of the inteſtines remains. But in what manner, and by what remedies, too great a laxity of the parts of the body may be ſtrengthened, has been ſaid in the comment to § 28, and more eſpecially here are convenient thoſe things which we recommended under the fourth number of the ſame aphoriſm. To this purpoſe conduce a drying diet, little drink, and ſtrong at the ſame time; hence in ſuch a diarrhœa Hippocrates [u] gave bread thoroughly toaſted for food, and he recommends very little drink, and of the ſtrongeſt kind. But the corroborating medicines are then beſt given in a ſolid form, that they may lie a longer time in the firſt paſſages, and deſcending ſlowly through the inteſtines may be ſucceſſively applied to every part of them. For this purpoſe is likewiſe recommended water wherein a red hot iron has been often extinguiſhed, and afterwards given as a drink, either alone, or mixed with an equal quantity of milk; others

[t] Ibidem Sect. IV. cap. 3. pag. 227.
[u] De ſalub. victus ratione Charter. Tom. VI. pag. 234.

others dip ignited plates of iron into milk for the same purpose; but thus the cheesy and creamy part of the milk is burnt, and gives it a disagreeable taste of burning. How great a force iron has in corroborating too lax and weak fibres was said at § 28. But of how great use these corroborants often are in the cure of the most obstinate diarrhœas, appears from the observations of Physicians. A man who had been a long time afflicted with a continual flux, and had spent all his substance in vain for a cure, was advised by Forestus [w] to eat a large quantity of unripe medlars, by which means his flux was cured in a few days time. He likewise observed the same effect from this medicine in a certain merchant, who fee'd Johannes Sprinhius, Physician at Louvain, with three hundred pieces of gold; but was at length cured of his diarrhœa, with which he had been afflicted many months, only by the use of medlars. The like remedies may be likewise injected by way of clyster [x]. And sometimes mild spices may be mixed with the astringents to irritate the flaccid intestines with a gentle stimulus. Fomentations of wine boiled or infused with astringents, or aromatics, may be also applied to the abdomen, or else aromatic emplasters may be used in their stead.

But before these medicines are made use of, we ought to be certain that the irritating matter is expelled, and that the only remaining disorder is a weakness and flaccidity of the stomach and intestines; for if a flux of the bowels is suppressed by astringents, before the noxious humours have been expelled, the most desperate maladies often ensue. For Hippocrates [y] observes, *Dysenteria*

[w] Lib. XXII. cap. 1. Tom. III. pag. 47.
[x] Sydenham. Sect. I. cap. 4. pag. 87.
[y] De victu in morbis acutis Charter. Tom. XI. pag. 162.

ſedata abſceſſum aut tumorem quemdam faciet, niſi (deſierit) aut in febres, vel ſudores, aut urinas craſſas & albas, & valde perſpicuas, aut in tertianas, aut in varicem, aut in teſticulum, aut in crura, aut in coxam dolor decubuerit. "That a "dyſentery being ſtopped, occaſions an abſceſs or "ſwelling in ſome part, unleſs it terminates either "in fevers, ſweats, or thick and white urines, "which become very clear; or unleſs it turns to "a tertian or varix, or unleſs a pain invades the "teſticle, leg, or hip." But it is ſufficiently evident, that he does not here treat of the radical cure of a dyſentery, by an expulſion of the morbific matter, but only of allaying the pain of the diſtemper, while in the mean time the material cauſe of the diſeaſe is expelled by other paſſages; or elſe being tranſlated to other parts of the body, it produces various other diſeaſes. Thus Hollerius [z] obſerves, that a dyſentery untimely ſuppreſſed ſometimes occaſions an epilepſy, and ſometimes a pleuriſy; and that even it had produced in a certain perſon an itch almoſt like a leproſy. Sydenham * remarks, that from the impeded diſcharge of the offending matter of the diſeaſe by aſtringents, when it has not been firſt evacuated by cathartics, apthæ have enſued, which for the moſt part denote imminent death. But we know that irritating matter is expelled, if the diſeaſe has already continued a long time, if vomiting and purging medicines have been uſed, if the pain and gripings are abated, and the inteſtinal diſcharge is changed for the better. For as Hippocrates [a] ſays, *In alvi enim fluxionibus dejectionum mutationes, juvant, niſi in pravas mutentur*; "In a flux of the bowels an alteration in

5 "the

[z] Comment. in Coac. Hippocr. pag. 876.
* Sect. IV. cap. 3. pag. 222.
[a] Hippocrat. Aphor. 14. Sect. II. Charter. Tom. IX. p. 52.

" the ſtools is of ſervice, unleſs they are changed " for the worſe." So long therefore as the ſtools are very fœtid, black, livid, eruginous, purulent, ichorous, bilious, and yellow, *&c.* aſtringents are prejudicial; but when they begin to come nearer to the natural condition of the inteſtinal fæces, and more eſpecially if the ingeſted aliments paſs through little altered, then there will be occaſion for corroborants and aſtringents.

By quieting the impetus of the humours with narcotics.] What great uſe theſe are of in moderating the violence of a fever, has been in ſeveral places taught by Sydenham throughout his works; and concerning this we treated more particularly in the comment to § 610. Moreover it appears from daily obſervation, that the uſe of narcotics often binds up the bowels very obſtinately. Hence it was cuſtomary with Sydenham [b] to give his liquid laudanum after the operation of purges was over in the cure of diarrhœas and dyſenteries; and as he gave purges every day, ſo on the intermediate days, in the morning and at night, he gave narcotics: *Ut ſcilicet ſymptomatum ferociam debellaret, atque inducias impetraret, dum cum humore peccante exterminando ipſi res eſſet.* " Namely, to ſubdue " the fierceneſs of the ſymptoms, and to command " a truce, ſince the engagement here lay in exter- " minating the peccant humours." Moreover, if the diſorder being more than uſually obſtinate did not yield to the third purge, he gave a paregoric night and morning every day, 'till the patient was perfectly recovered; and even ſometimes he repeated them every eight hours, and in a pretty large doſe, if the diſeaſe did not yield. When Bontius [c] practiſed phyſic in the Eaſt Indies, where

[b] Sect. IV. cap. 3. pag. 226, &c.
[c] Hiſtor. natur. & medic. India orient. Lib. II. cap. 3. p. 19.

the moſt dreadful dyſenteries are very frequent, he found that they were irritated even by the mildeſt laxatives with incredible torture to the patient, and were often ſure to be followed with the moſt pernicious conſequences; and theſe he was able to cure with nothing ſo ſafe and ſpeedy as by the extract of ſaffron[d], which contained a large quantity of the moſt choice opium: ſo highly did he eſteem this remedy, that he believed it to be truly an antidote to this frequently even venomous diſeaſe; for which reaſon he had always recourſe to this as his ſafeſt refuge, as well in dyſenteries as in that kind of flux which he calls hepatic; in which, without very ſevere gripings, pure blood was diſcharged by ſtool. Sydenham[e] likewiſe obſerves, that in thoſe years when dyſenteries were epidemical, evacuations were firſt neceſſary before laudanum could be given; and yet in a leſs favourable conſtitution of this diſeaſe, that thoſe evacuations might be ſafely omitted, and the cure effected a ſhorter way, namely, by the uſe of laudanum only.

But opium, or the great compoſitions of the ſhops in which it is an ingredient, being diſſolved in milk, and injected in the form of a clyſter, ſuppreſs almoſt every kind of flux[f], ſince by that means a ſort of topical reſt was introduced in the inteſtines, and the moſt ſevere gripes often immediately removed. When an ounce of theriaca diluted in three or four ounces of ſweet milk is injected by the anus, it will even as yet ſtop for ſome hours that fatal diarrhœa which attends conſumptive people, and which yields to no remedies, and by the repeated uſe of it the fatal exit of this diſeaſe may be retarded.

By

[d] Hiſt. natur. & medic. Indiæ orient. Lib. II. cap. 4. p. 20.
[e] Sect. IV. cap. 3. in fine, p. 235. [f] Ibidem, p. 229.

By directing them other ways by ſweats.] Hippocrates affirms (as we ſaid before upon another occaſion at § 586, N°. 2.) *cutis raritas ventris denſitas.* "That a laxity of the ſkin makes a dryneſs of the bowels." For in thoſe people who perſpire largely, as thoſe who are robuſt and healthy uſually do, the bowels are generally conſtipated; ſince a great part of the humours is exhaled from the ſurface of the body, which when the perſpiration is deficient tends inward, and uſually eſcapes either by urine or ſtool. When therefore the quantity and impulſe of the humours in fevers tends towards the inteſtines, as Sydenham[g] expreſſes it, the inflammatory rays are turned upon the bowels, and they are ſollicited to an expulſion; in that caſe it is often uſeful to determine the humours towards other parts of the body, and eſpecially towards the ſkin. The ſame thing alſo takes place, when after a long continued diarrhœa the inteſtines being relaxed, a greater quantity of humours is derived to them beyond what was uſual or natural; for then the humours being turned another way, urge leſs upon the weakened veſſels of the inteſtines; and thus there is an opportunity given them to contract themſelves more, or become ſtronger. It was ſaid before upon another occaſion in the comment to § 659, that when thoſe who were taken with the plague were put into a ſweat only by the weight of bed-cloaths, immediately the vomiting and purging ceaſed; the rays of the morbific matter which were before reflected inward to the ſtomach and inteſtines, now taking their courſe towards the ſurface of the body, as Sydenham[h] obſerves. Moreover, he has likewiſe remarked, that the epidemical dyſenteries which ſpread

[g] Sect. II. cap. 3. in fine, pag. 209.
[h] Sect. II. cap. 2. pag. 153.

in the first year, were more of a subtle and spirituous disposition, nor did they yield so readily to cathartics. But in these after bleeding premised, when the patient was in the flower of his age, he only gave a large quantity of whey for drink, and took care to have it often injected by the way of clyster; thus he diluted the acrid irritating stimulus, and observed the gripings and bloody stools to disappear after the fourth time of discharging the clyster: afterwards he confined the patient to his bed, where in a short time he spontaneously fell into a sweat, which he ordered to be continued for the space of twenty-four hours, but yet not to have the sweat provoked. By this mild sweat was discharged that humour which before rushing upon the intestines produced the disease. For if the patient left his bed sooner than the time specified, he observes that they were sure to have a relapse; and then they were obliged to repeat the same method of cure again [i]. But we here treat of such sweats as arise from the strength of the vital powers, and from nature prevailing over the disease; and by which sweats the irritating matter is expelled from the body, or the impulse of the humours diverted from the intestines. For when the sweats arise from the strength being overpowered by the disease, they rather afford a fatal sign, according to the observation of Hippocrates, who says [k]; *Ex alvo diu affecta* (κοιλίη μακρῇ) *vomentibus, bilioſis, cibum faſtidientibus, ſudor multus cum impotentia repentina, occidit.* "That in those, who have "been a long time afflicted with a flux or bilious "vomitings, and an aversion to food, a profuse "sweat with sudden weakness kills." And again [l], *Ex*

[i] Ibid. Sect. IV. cap. 3. pag. 231, 232.
[k] Coac. Prænot. N°. 638. Charter. Tom. VIII. pag. 890.
[l] Ibid. N°. 647.

Ex alvis liquidis perfrictio cum ſudore, mala. "That "a violent rubbing or ſcratching of the body, "with ſweats following from liquid ſtools, are bad "ſigns."

Or by urine.] It is evident that profuſe and long continued fluxes leſſen the other excretions. Thus in a lientery Hippocrates obſerves (as we remarked before at § 719.) that the drink does not penetrate to the bladder, and therefore is not expelled by urine. Degnerus [m] obſerves in an epidemical dyſentery, that the urine was generally ſo ſuppreſſed, that the patient hardly diſcharged a drop for the ſpace of ſix, eight, ten, or fourteen days. Hence Hippocrates places a due diſcharge of the urine among the ſigns of a lientery being cured, when he ſays [n]; *Indiget autem curatione hic morbus, donec & urina pro ratione ejus, quod in potu acceptum eſt, procedat, & corpus ab ingeſtis cibis augmentum capiat, & a malis coloribus liberatum fuerit.* "But the cure of this diſeaſe is ne- "ceſſary to be continued, until the urine is diſ- "charged in proportion to the drink taken in, "and 'till the body receives nouriſhment or increaſe "from the ingeſted food, and is freed from its "ill colour." A due excretion of the urine therefore affords a good ſign, ſince it denotes that the inteſtines do not depoſite all that is taken in, but that the juices being abſorbed by the venal orifices mix with the blood, and are afterwards diſcharged through the kidneys. But ſince naturally by the urine thoſe particles are expelled from the body which are become acrid and offenſive, it therefore ſeems very probable, that by the ſame paſſages ſuch other acrid particles might be expelled, which being conveyed to the inteſtines would cauſe an irri-

[m] Hiſtor. Dyſenter. cap. 1. § 29. pag. 17.
[n] Prorrhet. Lib. II. cap. 13. Charter. Tom. VIII. pag. 822.

tating ſtimulus. Perhaps the ſame thing is pointed at by Hippocrates[o], when he ſays, *In dolore hypochondriorum ſubmurmurante, lumborum dolor ſuperaccedens in febribus, ventres ut plurimum humectat, niſi flatus deorſum eruperit, vel urinæ copia prodierit.* "In the murmuring colics of hypo-"chondriac people, a pain of the loins ſuperve-"ning in fevers, generally produces a liquid "ſtate of the bowels, unleſs the flatus makes it-"ſelf a way downward, or unleſs a large quanti-"ty of urine is diſcharged." And in another place[p]: *Quibus alvus ab initio turbatur, urinæ vero paucæ ſunt, & progreſſu temporis alvus quidem ſiccatur, urina vero tenuis redundat, his abſceſſus ad articulos fiunt.* "In thoſe who have a dyſen-"tery or diſturbance of the bowels from the begin-"ning of the diſeaſe, and have the urine very ſmall "in quantity, but in proceſs of time the ſtools "become drier, and a great quantity of thin urine "is made, abſceſſes happen in ſuch about the "joints." For in the former caſe, the quantity of urine diverts the matter which would otherwiſe have rendered the bowels moiſt; but in the latter caſe the ſtools being dry, the quantity of the urine is increaſed; but at the ſame time it is thin, and therefore does not evacuate the offending matter from the body, but depoſits the ſame by metaſtaſis upon the joints.

But this determination of the humours otherways made by ſweats or urine is ſalutary, ſince by thoſe paſſages at the ſame time the offending matter may paſs out. But it ſometimes happens in diarrhœas and dyſenteries, that they are ſuppreſſed either ſpontaneouſly or by the untimely uſe of aſtringents, whence the offending humours, being tranſ-

[o] In Coacis Prænot. N°. 291. Charter. Tom. VIII. p. 868.
[p] Ibid. N°. 619. pag. 889.

tranſmitted to other parts of the body, produce new diſeaſes. Thus Sydenham has obſerved, the worſt kind of aphthæ proceed from this cauſe, as we ſaid a little before under the preſent aphoriſm; and others have obſerved, that epilepſies and the worſt kind of diſeaſes have proceeded from the ſame cauſe. Hitherto relates the following obſervation of Hippocrates[q]; *Quibus bilioſæ ſunt dejectiones, ſurditate nata ceſſant, & quibus ſurditas, hæc, ortis bilioſis dejectionibus, ceſſat.* "That a deafneſs "ariſing in thoſe who have a bilious flux termi- "nates the diarrhœa, and that ſometimes people "are cured of deafneſs upon the appearance of a "bilious diarrhœa."

By evacuating the morbific matter.] Namely, if this is lodged in the inteſtines, it is diſcharged by vomits, purges, or clyſters. But if the morbific matter is derived into the inteſtines from other parts, a more copious diſcharge by ſweat or urine may often ſerve for the ſame purpoſe, concerning all which we have already treated. But ſometimes it requires a very large ſpace of time to evacuate all the matter of the diſeaſe. Thus Sydenham obſerves[r], that a dyſentery, if it continues long, affects all the inteſtines ſucceſſively downward, 'till at length the whole force of the diſeaſe lies upon the rectum with a continual deſire of going to ſtool, though nothing more is diſcharged than a ſort of bloody mucus. But in this caſe he obſerves, that none of the common methods propoſed will ſuffice; and that topical remedies applied to the rectum under whatever form always prove miſchievous. But he judged this troubleſome teneſmus not to proceed from an ulceration of the rectum, but

[q] In Coacis Prænot. N°. 627. Aphor. 28. Sect. IV. Charter. Tom. IX. pag. 150.

[r] Sect. IV. cap. 3. pag. 234.

but rather becauſe the inteſtines, which by degrees reſume their former ſtrength, depoſite the reliques of the morbific matter upon the rectum. Hence he obſerves, that this diſorder is to be bore with, 'till the patient's ſtrength is recovered by a reſtorative diet, with agreeable cordials; by which means the ſtrength being increaſed, this troubleſome ſymptom gradually goes off in proportion of its own accord.

By correcting its firſt ſource or ſpring.] Namely, if we know that the inteſtines are ſupplied with acrid humours from an univerſal cacochymy of the blood; or if the like humours are collected in any particular part of the body, and from thence conveyed to the inteſtines. Thus in the worſt degree of the ſcurvy (ſee § 1151. N°. 4.) diarrhœas and dyſenteries enſue, which are not to be cured, unleſs the malignant cacochymy of the humours making the firſt ſpring or cauſe of theſe maladies can be removed or corrected. Sydenham [s] has ſometimes obſerved, though very rarely, that a dyſentery not rightly cured at firſt has continued for ſome years, when the entire maſs of the blood having acquired a dyſenteric cacochymy, continually ſupplies acrid or heating humours to the inteſtines; yet the patient is well enough with reſpect to the other functions.

In a woman thus affected who had tried many remedies without ſucceſs, bleeding often repeated, but at long intervals, ſubdued the obſtinate diſorder. Thus he removed the inflammatory cacochymy of the blood; which appeared from the blood extravaſated reſembling that in a pleuriſy, and from the conſiderable relief which ſhe perceived after each bleeding. But when, for example, in an abſceſs of the liver, a diarrhœa or dyſentery

[s] Sect. IV. cap. 3. pag. 235.

tery ariſes from a continual flux of the matter or ſanies into the inteſtines, it is ſufficiently evident how difficult it muſt be to correct or remove the firſt ſpring or ſource of the diſorder. If now a ſchirrhus formed in the liver degenerates into a cancer, and continually erodes the inteſtines by its acrid virus, who will be bold enough to hope for any thing of a cure in ſuch a caſe? If the Phyſician inſpecting the very fœtid ſtools of a dyſenteric patient about to expire, ſhould be immediately thrown himſelf into the like diſorder from the malignant exhalations, which I remember to have happened to a certain eminent gentleman: or if the diſeaſe ſhould be contracted by thoſe people who waſh the linen that has been fouled with the dyſenteric ſtools of the patient[t], what good can be done as long as the putrid fumes lodged internally, diſperſes its malignant virus every moment to the inteſtines? It is evident, no cure can be expected if this malignant ſource of the diſorder cannot be corrected. For the art of healing has its bounds, and the Phyſician, who knows how to diſcover an incurable diſeaſe, merits as much reputation as he that removes a curable diſeaſe.

[t] Degnerus de Dyſenteria, &c. cap. 1. § 41. pag. 32.

Of

Of Febrile Eruptions.

SECT. DCCXXIII.

INflammatory puſtules or exanthemata have generally for their matter ſomething which cannot paſs through the ſmalleſt veſſels of the ſkin, but heſitates, or ſtops there; but for their cauſe they acknowledge the circulatory, ſecretory, and excretory powers of life; hence theſe eruptions are manifold, according to the variety of theſe cauſes, ſo that fevers are afterwards denominated from thence eryſipelatous, ſcarlet, red and purple petechials, morbillous and variolous.

Efflorescencies or exanthemata are derived from ἀπὸ τῦ ἐξανθεῖν, which ſignifies to flower or blow out, ariſe or break forth; and it is uſually applied to thoſe humours which break out in the ſkin from the internal parts, ſo as to create ſome kind of puſtules or roughneſs [u]. Celſus calls them puſtules [w], and tells us, they are of ſeveral kinds: *Nam modo circa totum corpus partemve aſpredo quædam fit, ſimilis his puſtulis, quæ ex urtica vel ſudore naſcuntur: ἐξανθήμαλα Græci vocant, eaque modo rubent, modo colorem cutis non excedunt*, &c. "For they ariſe "with a ſort of roughneſs, either throughout the "whole body, or ſome particular part, like thoſe "puſtules which are produced by nettles, or from "ſweating. The Greeks call them exanthemata, "and

[u] Fœſii Oeconomia Hippocrat. pag. 131.
[w] Lib. V. cap. 28. pag. 326.

"and they ſometimes look red, and ſometimes "not exceed the colour of the ſkin, *&c.*" But theſe are all called by the ſame name of efflorescencies, whether they project beyond the ſkin (when perhaps they are properly to be called puſtules or pimples) or do not riſe above the ſkin, but only appear rough. Both theſe kinds are called exanthemata by Hippocrates. For in deſcribing the diſeaſe of Silenus, he ſays [x], *Octava die frigidum exſudavit per totum corpus, exanthemata cum ſudore, rubra, rotunda, parva, varis ſimilia permanebant, non abſcedebant.* "On the eighth day he had a "cold ſweat all over his body, and with the ſweat "he had ſmall round exanthemata of a red colour, "which continued like warts without ſcaling off." But in another patient [y] he obſerves, *Lata exanthemata non admodum pruriginoſa.* "Broad exanthe-"mata without much itching:" and Galen [z], in his commentary to this aphoriſm, likewiſe acknowledges this diſtinction of the exanthemata.

Since therefore the exanthemata appear in the external ſkin, it is evident the ſeat of them is in the cutaneous veſſels, and therefore for the moſt part that they acknowledge for their matter ſomething that cannot paſs through, but obſtructs thoſe veſſels. Thus in conſumptive patients, when the moſt liquid parts of the blood are expelled in night-ſweats, ſuch itching puſtules frequently ariſe in the cutaneous veſſels from the inſpiſſated blood heſitating there. But when theſe veſſels are conſtringed, either by more than uſually acrid humours ſent towards the ſkin, or from external ſtimuli irritating thoſe veſſels, we obſerve that the ſame efflorescencies are produced. Thus in healthy people, exerciſed

[x] Epidem. 1. Ægrot. 2. Charter. Tom. IX. pag. 101.
[y] Epidem. 6. ibid. pag. 415. & Aphor. 9. Sect. VI. Charter. Tom. IX. pag. 253. [z] Ibidem.

ciſed with hard labour in the ſummer heats, when a ſalt and ſtrong ſmelling ſweat is expreſſed, ſuch exanthemata frequently appear with a very troubleſome itching. The ſame is alſo frequently obſerved, from the more acrid ſubſtances applied externally to the ſkin, more eſpecially if they were mixed with any thing fat or oily. Hence it appears, that ſometimes exanthemata may be produced from a cauſe exiſting without the body, and applied only to its external ſurface, though for the moſt part they acknowledge for their matter ſomething which cannot paſs through the ſmalleſt veſſels; and thus in ſuch caſe, where the ſmall veſſels are irritated or contracted by external ſtimuli, the humours cannot paſs freely through them. Whether or no ſuch ſtimuli may not be lodged in the air with which we are inveſted, as are capable of producing this diſorder? Reaumur[a], to whom we owe many fair diſcoveries, upon handling the neſts of ſome caterpillars, was ſurprized to find a troubleſome itching in his hands, and eſpecially betwixt the fingers; but afterwards his face and eye-lids began to ſwell, and a troubleſome tumor of the eye-lids continued for four whole days; in vain he waſhed his hands with water, oil, and ſpirits of wine, for the troubleſome inflammation ſtill continued. But upon enquiry he found, that many ſmall hairs in the caſt-off ſkins of the caterpillars, when they were changed from the ſtate of a chryſalis or worm into that of a butterfly, fixed themſelves into the ſkin, and there continued to prick and irritate like ſmall rigid thorns. Nor did the ſmall hair of the exuviæ or caſt-off ſkins offend only by touching them, but if they were agitated by a ſtick, they produced nearly the ſame effect; and in the ſun-ſhine was able to perceive

[a] Memoirs pour l'Hiſtoire des Inſectes, Tom. II. Mem. 4. pag. 191, &c.

perceive, upon ſtirring theſe caterpillars neſts, that thouſands of ſmall corpuſcles floated in the air, which ſeemed to be nothing elſe than ſuch ſmall hairs ſhook out of the old caſt-off ſkins of the caterpillars; and therefore the reaſon appeared why theſe diſorders may be produced without immediate contact. But as this is obſerved throughout the large tribe of the common caterpillars, which may be thus of miſchievous conſequence; it therefore ſeems very probable, that theſe hairs may be carried by the wind to divers places, and produce the like diſorders. But the ſame author obſerves, that the troubleſome itching and inflammation produced from this cauſe by rubbing the parts affected with the leaves of parſley. Perhaps there are many like things floating in the air in particular times and places, which may produce the ſame effects. Thus Hippocrates [b] remarks, that great ſhowers with intenſe heats and ſoutherly winds occaſion itchings, and little watery bliſters, like thoſe from burns, under which the ſkin ſeemed to be burnt. But in this caſe will not the greater tenderneſs of the ſkin in ſome people render them more liable to be affected from the ſame cauſe than others? Four women, who were preſent with Reaumur, when he handled theſe neſts of the caterpillars, were afflicted with exanthemata on the neck. In delicate girls, and men of a tender conſtitution, I have ſometimes obſerved, that if upon getting out of bed in the morning they do but expoſe their face and hands to the common air, by opening the window, the ſkin of thoſe parts is immediately corrugated into pimples or little bliſters, with great itching; whether this ariſes from an obſtructed perſpiration excited by the morning cold, and irritating the ſkin, or elſe from acrid particles floating

[b] Epidem. 2. in initio. Charter. Tom. IX. pag. 118.

floating in the air, and diſperſed through it by the diurnal heat.

Moreover, obſervations teach us, that ſometimes the cauſe which excites itching and effloreſcencies is lodged in the ſtomach, and about the præcordia, from whence being expelled thoſe effects are immediately removed. When by misfortune a poiſonous muſcle is ſwallowed by any one, there follows ſooner or later great anguiſh, and ſoon after the ſkin almoſt of the whole body is beſet with exanthemata, attended with a violent itching; but if the contents of the ſtomach are immediately expelled by white vitriol, or any other vomit which operates immediately as ſoon as it is ſwallowed, thoſe effloreſcencies with the anguiſh ſoon diſappear; nor does it ſeem probable that this poiſonous acrimony mixes with the blood, and paſſes together with it to the ſkin, ſince after vomiting all the diſorders immediately ceaſe. I know a perſon who is immediately troubled with the ſame ſymptom from the taking of crabs-eyes; which ſymptoms are alſo removed when he has ejected them by a vomit. It may be therefore aſked, whether exanthemata may not in the like manner be produced in fevers, when ſuch malignant ſordes are collected about the præcordia? at leaſt what I have obſerved in my own practice, in the cure of theſe diſorders, ſeems greatly to confirm this opinion; namely, that when theſe ſordes or foul humours are evacuated, either upward or downward, or ſpontaneouſly by art, theſe exanthemata vaniſh. In the caſe of Silenus[c] mentioned by Hippocrates, from the firſt day of the acute fever were diſcharged ſincere bilious ſtools, frothy, and afterwards thin and black. On the ſixth day the ſtools were ſuppreſſed. On the eighth day ſmall round exanthemata broke out.

Poſſibly

[c] Epidem. 1. Ægrot. 2. Charter. Tom. IX. pag. 101.

Poſſibly becauſe the matter was collected about the præcordia, which before eſcaped by ſtool, but there rendered much more malignant by the diſeaſe. For Hippocrates remarks from the beginning to the end of the diſeaſe, that there was a continual palpitation of the hypochondria. In another place he alſo ſays; *Anxiis alvi turbatæ ſuppreſſio, brevi velut culicum punctura efflorescunt*, &c. "That in "thoſe who have a ſuppreſſion of the flux with "anxiety, there are ſoon after eruptions break "out like the bitings of gnats [d], *&c.*" And again, *Pruriginoſæ affectiones omnibus nigrorum dejectionem ſignificant, & vomitum grumoſum.* "That "itching eruptions of the ſkin denote a diſcharge "of black ſtools, and grumous vomiting [e]." From all which we may conclude, that a proper regard ought to be had to theſe cauſes.

But from whatever cauſe the exanthemata ariſe, it is certain, that during the time they are preſent, ſuch particles heſitate in the cutaneous veſſels, as cannot paſs freely through them, whether the diſorder proceeds from a fault in the fluids to be tranſmitted, or in the tranſmitting veſſels, or in both together. But as febrile eruptions moſt frequently ariſe from a critical depoſition of the morbific matter in ſome of the veſſels obſtructed, dilated, or broken (ſee § 593); that is, when the fever terminates neither in perfect health, nor death, but in another diſeaſe; from thence it is evident, that their efficient cauſe is the vis vitæ, which conducts the humours through the veſſels in a circulatory motion, ſeparates ſome from others, and frequently diſcharges them from the body by various paſſages. Thus we ſee in the ſmall-pox and meaſles, after a fever preceding, the morbific matter is ſeparated

[d] Coac. Prænot. N°. 564. Charter. Tom. VIII. pag. 885.
[e] Ibid. N°. 636. pag. 890.

and depoſited on the ſkin. Thus alſo in infants, after a ſlight fever preceding, the ſkin appears in ſeveral places beſet with ſpots, and ſometimes with large red puſtules; and ſoon after a glutinous humour is expreſſed through the dilated veſſels of the ſkin, where it often concretes into thick ſcales; and if the ſecretion or excretion of this humour is diſturbed by repellent and drying medicines, convulſions, fevers, and the worſt conſequences frequently follow. Theſe exanthemata are therefore of various kinds, according as they ariſe either from an increaſed velocity of the circulation only, or from a ſecretion of the morbific matter, or from an excretion of it at the ſame time. There is moreover a difference alſo to be obſerved in theſe from a diverſity of their matter: for ſometimes the cutaneous veſſels being filled with thick inflammatory blood, they look red; and ſometimes the like diſorder taking place in the thinner humours, they look yellow, or of the ſame colour with the ſkin, as Celſus obſerves in the place a little before cited. But ſince from theſe exanthemata in different fevers, which either accompany or follow after, a name is derived to them, therefore the moſt obvious kinds of theſe fevers are here enumerated.

Eryſipelatous.] What an eryſipelas is has been ſaid before in the comment to § 380. and it was alſo remarked in the comment to § 593, that a fever often ariſes in people before perfectly in health, without any previous known cauſe, which fever ceaſes after one, two, or more days, depoſiting a certain matter towards the external ſurface of the body, occaſioning red ſpots in various parts, but moſt frequently in the face, where in a very ſhort time they ſpread themſelves to a conſiderable ſize;

ſize; and then ſuch a fever is termed eryſipelatous. This fever moſt frequently happens towards the end of the ſummer [f], and ſometimes occaſions a redneſs with an incipient pain about each ear or the parts adjacent, and in the ſkin of the affected part there appears a numerous aſſemblage of ſmall puſtules, which, as the diſeaſe increaſes, generally ariſe into bliſters full of ichor: afterwards the eryſipelas ſpreads, and occupies ſucceſſively other parts of the face, which it often ſwells in a ſurprizing manner; and the eyelids are generally ſo inflated in a violent eryſipelas, that the patient cannot open them. After this the diſorder is frequently propagated ſucceſſively through the reſt of the ſcalp, the violence of the diſeaſe for the moſt part then leſſening in that part where it was firſt ſeated, while it ſtill continues in its greateſt vigour in other parts. The moſt known and frequent kind of eryſipelas is uſually obſerved to be thus; and the ſigns of this diſeaſe beginning ſeem to have been known to Hippocrates [g], when he ſays; *Rubores circa aurem, ex prægreſſo dolore in febribus orti, ſignum quidem Eryſipelatis in facie futuri: ſed & convulſiones ex talibus fiunt, cum vocis interceptione, & exſolutione*; "Redneſſes about the ear, "ariſing from a preceding pain in fevers, afford "the ſign of an eryſipelas about to follow in the "face; but from ſuch follow convulſions, with "ſtammering and loſs of ſpeech;" namely, when an eryſipelas does not throw itſelf outward, but invades the internal parts of the head, for then all theſe diſorders are to be feared. For, as we ſaid before in the comment to § 593, the good or bad event of this diſorder depends chiefly upon the part towards which the eryſipelas is determined by the

[f] Sydenh. Sect. VI. cap. 6. pag. 352.
[g] Coac. Prænot. N°. 201. Charter. Tom. VIII. pag. 863.

preceding fever: for there is seldom any great danger if it occupies the external surface of the body, unless it be repelled by ill treatment. But that this disorder is most dangerous when it invades the membranes of the brain, lungs, or other viscera, readily appears. Hence Galen[h] observes, *Quod Erysipelas circa cutim maxime consistat, tum hanc externam, quæ omnium partium commune est tegumentum; tum membranosam & tenuem, quæ singulis internarum circumtenditur.* "That an erysipelas takes up its seat chiefly in the external "skin, which is the common integument of all "parts of the body, as also in the thin membranes "which are spread round each of the internal "parts." But since when an erysipelas is seated in the face, it is considerably swelled into a large tumour, though at the same time the skin only seems to be affected, yet the panniculus adiposus lying under the skin must be equally affected; and hence Galen[i] well observes, that as a phlegmon, which has its seat commonly in the panniculus adiposus sometimes invades the skin; so, an erysipelas also sometimes occupies the flesh or fat under it: whence also when an erysipelas raises the parts into an inflammatory tumour, it is called a phlegmoneide erysipelas; and on the contrary, when a phlegmon occasions but a slight tumour of the parts with a considerable redness and heat of the skin, it is called an erysipelatous phlegmon, taking its principal denomination from the disorder which seems to be predominant.

There is likewise another kind of erysipelas described by Sydenham[k], which may be commodiously

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[h] Lib. XIV. Meth. Med. cap. 2. Charter. Tom. X. pag. 319.

[i] Ibidem.

[k] Sect. VI. cap. 6. pag. 353.

ly referred to febrile eruptions, though he says it does not so frequently occur as the former kind. But thus he describes it; *Hæc quolibet anni tempore invadit, idque hac ut plurimum* προφάσει; *quod scilicet æger vinorum subtilium magis magisque attenuantium potationi paulo liberalius indulserit, aut liquoris similis spirituosi. Febriculam, quæ agmen ducit, mox excipit pustularum per universum fere corpus eruptio, quæ urticarum punctiuras referunt, & nonnunquam in vesiculas attolluntur; mox recedentes tuberculorum more sub cute se condunt cum pruritu mordacissimo & vix tolerando, ac quoties leviſſimam scalpturam subeunt, rursum apparent.* "This invades at any season of the year, and that "for the most part with the following appear-"ance; particularly from the patients indulging a "little too freely in the drinking of thin wines, "which by degrees more attenuate or rarefy the "humours, or of any spirituous liquor of the like "kind. It begins with a fever, and soon after "is followed with an eruption of pustules al-"most throughout the whole body, resembling "those from the stinging of nettles; and some-"times they rise into little blisters; soon after "they disappear like pimples, and hide them-"selves under the skin with the most intense itch-"ing hardly tolerable, and appear again if the "patient scratches in ever so small a degree." I have several times seen a kind of exanthemata perfectly answering to this description, arising without any apparent signs, as well in the winter as summer, and sometimes in men and women of advanced age. They almost constantly perceived a troublesome itching about the præcordia before these exanthemata broke out; and if they suddenly went in and disappeared, as frequently happened, the anxiety returned, and ceased again if

the eruptions came out. Sometimes they occupy only certain parts of the body, but ſometimes they are diſperſed throughout the whole ſkin. I have often wondered at their ſudden diſappearance, and their returning again as unexpectedly in the ſpace of a few hours; as alſo at the great velocity with which they ſometimes move ſucceſſively through the moſt remote parts of the body. In a woman of fifty years old, I ſaw them inveſting the whole body on the firſt day, and on the ſecond they entirely diſappeared; but ſoon after followed anxiety and fainting, which went off, after an hour, when the exanthemata came out again; and again after a few hours they diſappeared. But then the patient was troubled with an intolerable itching betwixt the toes of both feet, which ceaſing after it had held about an hour, the upper lip immediately began to ſwell very much. Afterwards a copious ſweat was expelled from the body, whereby the diſorder ſeemed to be entirely removed, except a very ſlight itching, which ſtill continued for three or four days in one part or other of the body, which went off at intervals. But in the mean time during the whole courſe of the diſeaſe there hardly appeared any injury of the functions, if we except the anguiſh and fainting which happened when the exanthemata ſuddenly went in at the beginning.

Scarlet.] Very much like eryſipelatous fevers, but of a different kind, becauſe the eryſipelas generally invades the face, or if it occupies any other part of the body, yet it does not ſpread throughout the whole. But in the ſcarlet-fever the whole ſkin is beſet with ſmall red ſpots, which yet are more numerous, appear redder, broader, and leſs uniform than the ſpots of the meaſles. Theſe fevers generally appear at the latter end of the ſummer,

mer, and happen chiefly to infants [l]. After the ſpots have continued two or three days, they diſappear, with a ſcaling off of the cuticle.

Red and purple petechials.] This name is generally applied to ſuch fevers as are uſually malignant, ſpreading epidemically, and accompanied with ſmall ſpots in the external ſkin, which do not ariſe above the ſurface. They are alſo called puncticular fevers [m], becauſe the ſkin is marked with very ſmall points, ſometimes red and ſometimes purple. Sometimes they are alſo termed lenticular, when the ſpots of the ſame colour are broader. The red petechiæ are uſually of a good kind; but the purple, livid, and black, are more malignant, and almoſt conſtantly fatal. But altho' theſe exanthemata accompany an epidemical fever of a particular kind, as we are taught from medical hiſtory; yet purple or black petechiæ appear in other moſt dangerous diſeaſes, as ſigns of death at hand. Thus in the plague at London [n] people were taken in the middle of the ſtreets with an eruption of purple ſpots, without being conſcious of any diſorder, and were followed with immediate death. Alſo in the cure of peſtilential fevers from too ſoon interrupting the ſweats, or from diſturbing the cure by bleeding, urged by the perſuaſion of the patient or his friends, theſe fatal exanthemata have appeared. Sydenham [o] has obſerved that the meaſles in adults after a very hot regimen turn livid, and ſoon after black, and then it is over with the patient, unleſs immediate relief be given by bleeding and cooling with a more temperate regimen. He obſerved that purple ſpots interſperſed

[l] Sect. VI. cap. 2. pag. 328.
[m] Sennert. Lib. IV. cap. 13. Tom. 2. pag. 199.
[n] Sydenham. Sect. II. cap. 2. pag. 133.
[o] Idem Sect. IV. cap. 5. pag. 246.

in the ſmall-pox almoſt conſtantly preſage death [p]: and in the height of the ſmall-pox he alſo obſerved ſmall black ſpots, hardly equal to minikin pins heads [q]. And the like has been alſo ſometimes obſerved by myſelf in the worſt ſpecies of the ſmall-pox. In a lad four years old, lying ill of an acute continual fever, with an inflammatory pain of the abdomen, towards the end of the third day of the diſeaſe, when the pulſe was quick and ſmall, the face inclined to livid, and the ſudden remiſſion of the pain denoted that a gangrene began to occupy the internal parts of the abdomen: Here I obſerved black ſpots to break out upon the legs and thighs, and which were broader in the groins, but in the arms they were hardly ſo large as a minikin pin's head; but in the breaſt they appeared more of a red colour, yet they ſoon after turned livid, and death followed. From whence it is evident, that ſuch exanthemata ariſe in many diſeaſes; and the like we read to have been obſerved by the ancient phyſicians. Hippocrates [r] tells us, *Quum calida febre detento* (ὑπὸ θερμωλῆς ἐχομένῳ) *ulcuſcula eruperint in ambitu livida, debili exiſtenti, moritur. Quum a quopiam morbo detento, imbecillo jam exiſtenti livores eruperint, lethale.* "That "when ulcuſcules break out livid in their edges, in "the body of a perſon lying ill of an inflamma- "tory fever with great weakneſs, death follows: "for when the patient is ſpent or weakened with "any other diſeaſe, livid eruptions are fatal." Thus Galen [s] remarks in the beginning of a raging peſti-

[p] Sydenham. Sect. III. cap. 2. pag. 173.

[q] Ibidem.

[r] Hippocr. de locis in homine cap. 12. Charter. Tom. VII. pag. 371.

[s] Method. Medend. Lib. V. cap. 1. Charter. Tom. X. pag. 122.

peſtilence, that a certain young man who had lain ill nine days, had ulcerous eruptions throughout his whole body, as alſo had every one elſe who recovered. But that theſe ulcers were exanthemata, appears from his making uſe of the word ἐξανθῆναι, and ſoon after towards the end of the ſame chapter [t] he expreſsly ſays: *Qui evaſuri erant, iis exanthemata nigra per totum corpus confertim apparuerunt, plurimis quidem ulceroſa, omnibus autem ſicca. Et erat evidens intuenti, corrupti in febribus ſanguinis eſſe reſiduum, veluti cinerem quemdam pellente natura verſus cutim, velut alia plura ex ſupervacuis.* "They who were to eſcape had black exanthemata appearing thick ſet throughout the whole body, many of which were indeed ulcerous, but all of them dry. And it appeared evident to one who conſidered the caſe, that what remained of the blood being corrupted in theſe fevers, was thrown off by nature towards the ſkin, as a ſort of uſeleſs aſhes, as ſhe likewiſe throws off many other ſuperfluous matters."

But petechial fevers properly ſo called are thoſe which ſpread epidemically, and in which ſmall red, aſh coloured, purple, livid or black points break out in the ſkin, ſooner or later according to the violence of the diſeaſe; and indeed this critical depoſition of the morbific matter towards the ſkin is cuſtomary in theſe fevers; in which if they happen at a proper time of the diſeaſe, namely, on the fourth or ſeventh, or (when the violence of diſeaſe is moderate) on the fourteenth day, and eſpecially when the exanthemata are not very numerous, but of a red colour, the event is uſually ſucceſsful; the pulſe then riſing when the exanthemata break out, and the other ſymptoms, as watchings, delirium, intolerable

[t] Method. Medend. Lib. V. cap. 1. Charter. Tom. X. pag. 124.

intolerable thirſt, ringing in the ears, dulneſs of the ſight, &c. ceaſing, or at leaſt very much leſſening. But when theſe exanthemata did not break out at all, or if they came forth livid or black and very numerous, there was always the greateſt danger; and in thoſe who periſhed of this diſeaſe, there was indeed the appearance of theſe eruptions, but lying very deep under the ſkin, as if nature, overpowered by the violence of the diſeaſe, could not complete this critical tranſlation which ſhe had begun. But the very worſt ſymptoms certainly returned, if theſe exanthemata ſuddenly diſappeared, as the phyſician experienced in himſelf, who deſcribed this diſeaſe when it was epidemical at Cologn [u]. For then theſe exanthemata broke out all over the body like flea-bites about the fourth or fifth day of the diſeaſe, and on the beginning of the ſeventh day, the pulſe became larger and fuller, the habit of the body appearing more than uſually moiſt (which he ſays is a fore-running ſign of nature endeavouring to expel the diſeaſe by ſweat) by very plentiful drinking of a mild decoction of barley a ſweat broke out, which continued ſomething leſs than twenty-four hours. But when the ſweat was ended, and he believed all the danger was over, he put on clean linnen, being firſt warmed; but ſoon after he felt a chilline ſs all over his body, and the ſpots ſuddenly diſappearing, he was taken ſo ill that every one deſpaired of his life. He then took a ſpoonful or two of Spaniſh wine, and by that means reviving, he continued the uſe of the wine till his whole body grew hot again, and in a little time after not only the former ſpots returned, but new ones broke out, partly red and large, and partly ſmall and brown. About the fourteenth day he again

[u] Laur. Donckers Idea febris Petechialis, pag. 443.

again fell into a critical ſweat, whereby the diſeaſe was indeed terminated, but not entirely, and therefore he daily made uſe of a cordial mixture promoting a ſweat for ſome hours by plenty of warm drink; and thus he recovered ſlowly, but was well before the twenty-firſt day. We before obſerved upon another occaſion from Sydenham, how dangerous it was to interrupt the ſweat once raiſed in the cure of a peſtilential fever, before the received contagion was entirely evacuated. See alſo what has been ſaid upon this diſeaſe by Fracaſtorius de morbis contagioſis, and in Schenkius [w].

The ſtricteſt enquiry ought therefore to be made into the nature of the diſeaſe, to which theſe exanthemata appear; for ſometimes they ariſe from the too great violence of the fever, more eſpecially if that is increaſed by ſtimulating cordials, or a hot regimen, and then nothing good can be expected from their eruption. But ſometimes the like exanthemata attend epidemical fevers, wherein the morbific matter is by theſe thrown outward; and then they are of ſervice. In the firſt caſe a violent fever creates heat, and the ſigns of an inflammatory diſeaſe attend. But in the latter caſe, as the obſervations of authors teſtify, the pulſe though quick is weak, and all the ſtrength overturned, and there appears a fallacious gentleneſs in the beginning of the diſeaſe though it is malignant, and ſome relief is obſerved when theſe exanthemata break out. From hence there ſeems to be diſtinction enough to be made betwixt theſe diſeaſes. Sydenham [x] obſerved a kind of fever which he called variolus, at the ſame time when the ſmall-pox were epidemical, and ſo named it, becauſe it had many ſymptoms in common with

[w] Obſervat. Medic. Lib. VI. pag. 768.
[x] Sect. III. cap. 3. pag. 200.

with the ſmall-pox; in which fever there was alſo an eruption of petechiæ. There was a great propenſity to ſweats attending from the very firſt day of this fever, but without any relief; but even if the diſcharge of the ſweats was promoted by cordials, or the hot regimen, the petechiæ became more numerous, and at the ſame time all the ſymptoms of the diſeaſe were increaſed. He therefore moderated the too great violence of the fever by a thin diet, with bleeding and cooling medicines; and he prevented the ſweats which would have been miſchievous, by ordering the patients out of their beds. He always obſerved the ſucceſs of this method to be happy; and if the diſeaſe treated in the other method had tortured the patient for ſix or eight weeks, if death did not intervene, he was obliged to place his hopes in a copious ſpitting, which he had ſo frequently obſerved to be ſalutary in the worſt kind of the ſmall-pox.

But there are obſerved different degrees of malignity in theſe petechiæ; for ſometimes they look red, and then ſeem to be nothing more than little inflammations in the cutaneous veſſels, diſperſing for the moſt part in a very little time, or going off with a ſlight deſquamation of the cuticle in the affected parts. But when they are aſh-coloured, brown, purple, or black, they are juſtly eſteemed of worſe import; perhaps becauſe then the ſmall veſſels are broke, and the humours are ſeen thro' the cuticle extravaſated underneath of thoſe colours, being as it were a ſort of ecchymoſes; which ſeems very probable, ſince according to the authors who have deſcribed the petechiæ ſpreading epidemically, they ſeem to diſappear again by degrees, and change from a livid or black, to a more dilute colour before they vaniſh. In the year 1742, in the month of Auguſt and September, I ſaw one

or two patients afflicted with petechiæ in this city of Leyden, ſpots of a black or of a deep purple colour appearing throughout the whole body, which yet by degrees vaniſhed, changing into a more dilute colour. But I had not an opportunity to obſerve the whole courſe of the diſeaſe, being only called when the exanthemata had already appeared for ſome days. But there were many more people taken with this diſorder, but only thoſe of the lower rank; and ſome of them, I am informed, periſhed of that diſeaſe. But phyſicians of large practice, who are continually employed among the poor, know well how difficult it is to ſift out the hiſtory of the preceding diſeaſe from ſuch people. But I thought I could perceive a gradual change in the colour for the better, as the eruptions went off, in the ſame manner as when ecchymoſes diſappear. But when ſuch exanthemata produce a true mortification or blackneſs of the ſkin, or change it of a livid or leaden colour, it is ſufficiently evident that there is the greateſt malignity of the diſeaſe, but then they never gradually diſappear again; but if the patient recovers, the gangrenous and dead parts of the ſkin are ſeparated from the reſt by an ulceration formed in the circumference. Such petechiæ perhaps appear more rarely, yet there are inſtances of theſe to be found in medical hiſtory. In a certain part of France the purple fever (for thus they uſually call the petechiæ) was epidemical, which in the ſpace of two days, or at moſt of three, carried off the patient; but in thoſe who recovered from this deſperate diſorder almoſt the whole ſkin fell off. But ſuch was the corruption of the bodies dying of this diſeaſe, that no one durſt open them, and even many died among thoſe who interred them [y].

Theſe

[y] Acad. des Scienc. l'An. 1715. hiſt. pag. 18.

Theſe ulcerated exanthemata ſeem alſo to have been of the kind which Galen ſaw in thoſe who recovered from the plague; for theſe, as is evident from the paſſage lately cited from him, were alſo changed into ulcers. It is evident from what was ſaid in the comment to § 423, N°. 2. that the febrile matter is ſometimes depoſited upon various parts of the body, and that it is often ſo malignant as perfectly to deſtroy the part upon which it ſettles by a mortification, ſo that the extremities of the body, being ſphacelated from this cauſe, have fallen off from the reſt. The ſame thing ſeems to happen in the worſt kind of the petechiæ, wherein the like malignant humour is depoſited upon the ſkin. It alſo appears that this diſorder often proves fatal of a ſudden, when the internal parts of the body are thus affected by the ſame matter. For that this ſometimes happens ſeems very probable, as the like has appeared upon opening the bodies of thoſe who have died of the ſmall-pox. Galen [z] remarks, where he deſcribes thoſe black and ulcerous exanthemata concerning which we lately treated, that a certain patient afflicted with this diſeaſe brought up a ſcab by coughing, namely the cruſt which covered the upper part of the ulcer; and by more inſtances enough he evidently demonſtrates that the like ulcerous eruption was ſeated in the wind-pipe.

Perhaps it is alſo worthy of notice that in the malignant kind of the purple fever obſerved among the French, thoſe patients who the moſt readily recovered diſcharged worms, and then the exanthemata appeared. A diſcharge of worms is likewiſe mentioned by other authors who have writ upon petechial fevers [a].

Morbillous.

[z] Meth. Med. Lib. V. cap. 12. Charter. Tom. X. p. 122.

[a] Laur. Donkers Idea febris petech. pag. 3. Foreſt. Lib. VI. obſerv. 39. Tom. I. pag. 238, 239.

Morbillous.] For a fever precedes the eruption of the meaſles; and in the regular kind of the meaſles this eruption uſually happens on the fourth day of the diſeaſe. But in the leſs regular kind of the meaſles the exanthemata appear ſometimes ſooner and ſometimes later. In the firſt ſtage of the fever of this diſeaſe, before the meaſles break out, there are many ſymptoms in common with thoſe of the variolous fever. But the fever of the meaſles is commonly diſtinguiſhed by a ſlight cough, with a greater heavineſs in the head and ſleepineſs, and the eyes water. But the eruptions of themſelves of the meaſles following after the fever, uſually appear firſt in the face like flea-bites, which increaſing in number and ſize, run together and compoſe ſpots varying as to ſize and figure. Thoſe ſpots are compoſed of red pimples joined together, the elevation of which above the ſkin is perceptible rather to the touch than the eye. Afterwards the like ſpots are ſpread about the belly, arms, legs, and thighs; but yet the pimples do not appear ſo diſtinct in theſe parts as in the face. In the leſs regular kind of the meaſles, the eruptions frequently appear firſt on the limbs and trunk of the body. About the ſixth day the exanthemata begin to be leſs coloured in the face, but then the ſpots appear very large and red in the other parts of the body. Afterwards theſe efflorescencies going off, all the parts which they invaded look white, as if they were ſprinkled with flour, from the rupture of the cuticle, which falls off like ſcales. But this peculiarity have the meaſles, that when they go off, tho' at the proper time of the diſeaſe, the fever increaſes, the cough and difficulty of breathing augment, and even frequently a peripneumony follows. Theſe are the principal marks whereby the meaſles are diſtinguiſhed from other eruptive fevers, concern-

ing which Sydenham gives us many obſervations in his works, which deſerve to be read.

Variolous.] But ſince we are to treat hereafter of the ſmall-pox under its proper title, it may be ſufficient at preſent only to name them.

SECT. DCCXXIV.

CONCERNING the three latter of theſe fevers it is cuſtomary to treat ſeparately: but the diagnoſis and prognoſis of the three former may be eaſily formed.

For the petechiæ, and more eſpecially the purples, meaſles, and ſmall-pox, as they have frequently a very great difference, are therefore uſually treated of ſeparately by authors, though they are comprehended under the general name of exanthemata. For they have a great number of different ſymptoms, and many things occur which ought to be remarked as well in the diagnoſis and prognoſis in the cure. But the other febrile exanthemata require almoſt all of them one and the ſame method of cure, which we ſhall preſently declare. But the diagnoſis is eaſy, ſince they lie expoſed to the eye by being ſeated in the external ſurface of the body. Hence Hippocrates [b] divides theſe diſeaſes into two kinds, namely thoſe manifeſt to the eye, and thoſe which are occult; thoſe which break out and ſwell in the ſurface, he ſays, are manifeſt. From what has been ſaid under the preceding aphoriſm, the mutual difference of febrile exanthemata with reſpect to each other is ſufficiently apparent. Nor will the prognoſis of them be

[b] De Arte, cap. 8. Charter. Tom. II. pag. 150.

be difficult, since there does not seem to be much danger to be feared from them. Thus Hippocrates [c] remarks, as we observed before upon another occasion in the comment to § 593, that in fevers happening in the summer time there were eruptions like flea-bites raised about the seventh or ninth day in women, and yet none of them were killed thereby. Sydenham [d] so little feared the scarlet fever, that he said it was rather the name of a disorder than a disease itself; nor is there much danger attending even in an erysipelas itself seated in the external parts, unless it is made worse by a perverse treatment, otherwise it generally admits of a happy cure; and yet greater caution is necessary in this than in the scarlet fever, or in those fevers where red pustules break out. For Hippocrates [e] remarks: *Erysipelas si foras diffusum intro vertatur, malum: si vero intus diffusum foras vertatur, bonum.* "That if an erysipelas spread ex-" ternally turns inward it is a bad sign; but if " being diffused internally it turns outward, it is " a good sign." Even in another place [f] he pronounces it fatal; and observes that the erysipelas then turns inward, when the redness disappearing there is an oppression or heaviness at the breast, and a difficulty of breathing. But in the same place he treats of a quinsy, in which frequently, as we shall afterwards declare, there is an erysipelatous redness diffused through the neck and breast, which relieves the patient: but when this erysipelas suddenly disappears there is the greatest danger, and therefore neither does this prognosis in general belong to any kind of erysipelas.

[c] Epidem. Lib. II. Charter. Tom. IX. p. 155.
[d] Sect. VI. cap. 2. pag. 336.
[e] De Morbis, Lib. I. cap. 4. Charter. Tom. VII. p. 535. & Aphor. 25. Sect. VI. Charter. Tom. IX. pag. 261.
[f] Coac. N°. 366. Charter. Tom. VIII. pag. 872.

SECT. DCCXXV.

THE cure of theſe eruptions is not difficult, ſince they ſeldom require any thing more than to keep their matter fluid and moveable by a ſufficient large quantity of thin or light liquors, and by continually maintaining the vis vitæ under its due moderation; for then in a ſhort time they go away with a ſcaling off of the cuticle.

Since in theſe eruptions there is a ſalutary endeavour of nature to derive the matter of the diſeaſe towards the ſurface of the body; and frequently the phyſician is not called, 'till the matter itſelf is depoſited on the ſkin, and the exanthemata appear to view, it is ſufficiently evident that the cure is not difficult; and frequently that it requires little or no aſſiſtance from art. Hippocrates [g] indeed has pronounced (as we obſerved before upon another occaſion in the comment to § 605. N°. 13.) that the matter is to be drawn off by convenient paſſages the ſame way that it inclines: But we find that this practical rule has been much abuſed; becauſe many phyſicians believe it neceſſary to urge the matter forward, that nature might the better and the ſooner perform what ſhe had undertaken. But Hippocrates [h] has limited and explained this rule in other places: For in his aphoriſms he ſays; that the matter is to be drawn by convenient ways towards

[g] Hippocr. de Humor. Text. 2. Charter. Tom. VIII. pag. 516.

[h] Aphor. 21. Sect. I. Charter. Tom. IX. pag. 38.

towards that part where nature inclines it; but then he adds; *quæ ducere oportet*. "That which ought "to be drawn." And in the preceding aphorism * he well obſerves; *Quæ judicantur, aut perfecte judicata ſunt, nec movere nec innovare oportet, neque medicamentis, neque aliis irritamentis, ſed ſinere*. "That one ought not either by medicines, "or any other kind of irritation, to move, nor "change the matter in thoſe diſeaſes, which are "near upon, or perfectly arrived to a criſis, but "that one ought then to do nothing." Concerning which he ſpoke more at large in the comment to § 587, where we treated of a criſis. Since therefore in theſe eruptions, concerning the cure of which we here treat, the matter is carried to the ſkin, there is evidently no occaſion for many remedies. It will be ſufficient for the patient to take in a large quantity of diluent liquors to keep the matter fluid and moveable, that it may be eaſily extricated from the humours, diluted by theſe drinks; while by the ſame means the veſſels are relaxed; and thus very eaſily give a paſſage to the humours to flow through them. For the fluids being rendered moveable, and the veſſels pervious, the circulation will become the moſt free through all parts of the body, whereupon all the ſecretions depend. Hitherto happily conduce decoctions of the roots of graſs, vipers graſs, burdock, &c. with the juice of citrons, and a little nitre; or the woods of ſanders, ſaſſafras, &c. infuſed in a large quantity of water; which by a gentle aromatic ſtimulus diſpoſe to a diaphoreſis without conſiderably increaſing the motion of the circulating humours, and perfectly anſwer the curative indication. At the

* Aphor. 20. Sect. I. Ibid. pag. 36.

ſame time alſo care muſt be taken to continue to preſerve the vital powers in a due moderation, that they may be neither too dull, nor too exorbitant in their operation. But by what ſigns one may know that the vis vitæ is either too intenſe or remiſs, and by what remedies it may be maintained in, or reduced to a due moderation, has been ſaid before at § 609 to 612. Hence Sydenham † uſed no medicines in the ſcarlet fever, but ordered the patient to keep at home, and abſtain from fleſh and ſpirituous liquors of all kinds, leſt the cold air, by conſtringing the cutaneous veſſels, ſhould diſturb or hinder the incipient depoſition of the morbific matter upon the ſkin. Yet he would not have the patient continually confined to his bed, knowing well that this increaſed the heat; and therefore his whole practice conſiſted only in maintaining the preſent condition, by which a derivation was made of the mild inoffenſive matter towards the ſkin, there to be ſeparated from the blood; and he obſerves, that thus the diſeaſe might be very eaſily got over without danger or trouble; when, on the contrary, other phyſicians, being too buſy with cordials, and confining the patient to his bed, with many unneceſſary remedies frequently diſturbed the diſeaſe, or even ſometimes rendered it fatal. Yet he adviſes, that if convulſions or a coma ſupervene during the eruption, as ſometimes happen in younger ſubjects, then a large and ſtrong bliſter ſhould be applied to the neck, and a paregoric ſhould be immediately given, and repeated every night 'till the patient recovers.

When theſe exanthemata vaniſh, there is commonly a ſcaling off of the cuticle, and during that time

† Sect. VI. cap. 2. pag. 329, 330.

time he has obſerved a gentle purge given to be uſeful; which was alſo his practice to give after the ſmall-pox.

By this method are ſafely cured, not only the ſlighter exanthemata, but alſo the happy ſucceſs in the cure of the meaſles and ſmall-pox depends on a due regimen and moderation of the vital powers; and an importunate haſtineſs by which the phyſician or attendants of the patient endeavour to haſten the eruption, has too frequently made the diſeaſe fatal (as we ſhall declare more at large hereafter in the hiſtory of the ſmall-pox.)

But if the ſigns denote that foul humours are lodged about the præcordia, from whence exanthemata ſometimes ariſe, as we ſaid at § 723, it will then be convenient to expel them by giving a purge or a vomit.

It will be, perhaps, not improper on this occaſion to obſerve, that ſometimes wonderful eruptions of this kind happen in the ſkin in people who are well in other reſpects, being only a ſalutary endeavour of nature to expel offending humours by the ſkin. Thus I have known people, who in the height of the ſpring have every year had a red ſpot break out in this or that external part of the body, which, after continuing two or three days, has ſweated out a viſcid humour expreſſed from the dilated veſſels of the ſkin, and which often hardening into a thick yellow cruſt, has afforded a very ill aſpect, more eſpecially if the diſorder appears in the face. In others I have ſeen the like eruptions, but without tranſuding any humour, and the cuticle always ſcaled off from the affected part, till by degrees the diſorder vaniſhed. I confeſs myſelf to have performed only the part of a ſpectator in many ſuch caſes, when I had ſeen

many things tried in the like circumſtances without effect, though I endeavoured to evacuate by purges, ſudorifics, *&c.* the matter which I believed to be the ſource of theſe eruptions. But to hinder theſe ſalutary endeavours of nature by external deſiccative or repellent medicines is dangerous, as many obſervations teſtify, unleſs the like break out again in other adjacent, or more diſtant parts. Thus Bennet [i] obſerved, Sic *Juveni euſarco & robuſto impetiginis materiam, topicis toties quoties repreſſam, ad inteſtina repulſam, colici atrociſſimi paroxyſmos intuliſſe, vidit* Benedictus *a qua male curata, aut ſponte reducta, phthiſin dein ſubortam deprehendit.* "That the matter of a ring-worm or "cutaneous eruption, whenever it was repelled "towards the inteſtines by the uſe of topicals in a "ſtrong luſty young man, it occaſioned moſt ſe"vere fits of the colic; and from this caſe ill"treated, or from a ſpontaneous return of the "matter, the patient was afterwards ſeized with "a pulmonary conſumption." Sometimes alſo theſe diſorders are chronical, and then the body acquires a habit of freeing itſelf by theſe paſſages from ſuch humours, as being retained would be miſchievous. For I have ſeen ſuch eruptions reſiſt all the means that could be tried, happily perhaps for the patient, ſince a ſudden removal of ſuch chronical diſorders of the ſkin may produce the moſt dreadful conſequences, as we may learn from a ſurpriſing caſe related in the memoirs of the royal academy of ſciences at Paris [k]. A woman of a good habit after a lying-in was troubled with a morphew or mealy ring-worm in her hands for eight or ten

[i] Theatr. tabid. Exercit. 13. pag. 42.
[k] Acad. des Sciences 1703. Mem. pag. 21.

ten years, with which being tired, she imprudently applied to the affected parts a certain limpid liquor like pure water, which took such effect, that the disorder disappeared in the space of twenty-four hours; but at the same time there ensued a most troublesome inclination to vomit, with a sense of suffocation or oppression. When these symptoms ceased the head was affected, and then there was observed a kind of erysipelatous defluxion at the sides of the nose, the menses; which had hitherto flowed as they ought, now ceased; the nose, lips and eye-lids, were so swelled, that she could not open them for several months, the lips were turned outward; upon touching the whole skin of the face it oozed out a liquor, the salival glands swelled, and all the teeth of the lower jaw fell out, together with a great many of those in the upper jaw, though they had not suffered any alteration in their colour, *&c.* At the expence of so many calamities did the unfortunate patient reap the cure of a disorder, which was easily tolerable of itself, and but little more than a deformity. It is therefore evident that in the like cases the greatest care is necessary in the cure of such disorders; and that one ought prudently to discover whether the disorder is seated in the skin itself, or whether it is from something secreted and deposited upon the skin from the rest of the humours, in order to free the body from something injurious. There is a piece of good advice given us in this respect by Hippocrates [1], when he says; *Impetigines & lepræ & vitiligines albæ, quibus quidem juventibus aut pueris aliquid horum factum est, aut paulatim conspectum in multo tempore augescit, his quidem non*

[1] Prorrhet. Lib. II. in fine Charter. Tom. VIII. pag. 828.

oportet putare, abſceſſum eſſe hanc efflorescentiam (τὸ ἐξάνθημα) *ſed morbum. Quibus vero horum aliquid factum eſt multum & de repente, hoc ſane fuerit abſceſſus.* "Ring-worms, leprous diſorders, and "morphews, with which ſometimes young people "and children are afflicted, or which appearing "gradually to view, increaſe in proceſs of time, "we ought not to think in theſe caſes that the ef-"floreſcence is a critical diſcharge or depoſition, "but an original diſeaſe. But when appearances "of this kind happen ſuddenly, and ſpread largely, "then probably it may be a critical depoſition."

SECT. DCCXXVI.

THE reſt of the ſymptoms of a fever are related to thoſe which have been already conſidered, or elſe require to be treated as the diſeaſe itſelf.

Thus have we gone through the treatment of the principal febrile ſymptoms, which were enumerated at § 617. But ſince there is hardly any diſeaſe but what is at ſome time accompanied with a fever, it is therefore evident that all thoſe diſeaſes cannot be conſidered as febrile ſymproms. The other diſorders therefore which accompany a fever, are either like the febrile ſymptoms already deſcribed, and from the hiſtory of which their nature and treatment may be underſtood; or elſe they are ſuch as we ſhall treat of hereafter, when we come to deliver the hiſtory of the principal acute and chronical diſeaſes.

SECT.

SECT. DCCXXVII.

HENCE it appears what we are to think concerning the variety of fevers; for thoſe which run through the febrile motion with a continued ſtrain to the end, after being once excited, we call continual; but thoſe which abate their force, and again increaſe it at intervals, the fever ſtill continuing all the time, are termed continual remittents; but thoſe again which abate their force at intervals, being attended with a plain abſence of the fever betwixt any two paroxyſms or fits of the diſorder, are called intermittents.

Having thus delivered the general hiſtory and cure of fevers, with the principal ſymptoms which uſually attend; the various kinds of fevers ought next to be conſidered, in order to ſee whether they require any thing different in the cure from what has been laid down for the treatment of fevers in general. Properly ſpeaking, there are but two diſtinct kinds of fevers; one, *Cujus omne tempus tantum una acceſſio eſt, a principio ad ſolutionem uſque*: "Wherein the fever continues preſent upon "the patient during the whole time of the diſeaſe "from the beginning to the end[m]:" and the other which runs through its courſe by fits of going off, and returning again at intervals. The firſt is termed

[m] Galen. de Febribus Lib. II. cap. 2. Charter. Tom. VII. pag. 128.

termed continual; but the latter, if there is a perfect abſence of the fever betwixt the fits, is called intermittent. But when the violence of the fever only abates and increaſes again at intervals, never perfectly leaving the patient from the beginning to the end, though it is at one time more violent, and at another time more remiſs, it is then called a continual remitting fever, to diſtinguiſh it from that kind which runs through its courſe from the beginning to the end without any exacerbations. But intermitting fevers oftentimes join and continue their paroxyſms in ſuch a manner one upon the back of the other, that they put on the face of a continual fever, and that with ſo much reſemblance, that they cannot be diſtinguiſhed but by thoſe who are well ſkilled. Thus, for example, if an intermitting tertian is doubled, then a new acceſſion or fit invades the patient on the day which is free from the paroxyſm in a ſimple tertian, and then ſuch a fever reſembles a quotidian; from which however it is diſtinguiſhed, becauſe the paroxyſms, which invade every other day, are found like each other as to the hour of invaſion, number, violence of the concomitant ſymptoms, and continuance of the fit itſelf; and at the ſame time there is generally a conſiderable difference betwixt the fits themſelves, which follow immediately after each other. For example, the febrile paroxyſm in a double tertian which invades on the firſt day of the diſeaſe, will be like unto that which returns on the third day, but different from the fit which happens on the ſecond day; which laſt will again reſemble the paroxyſm which attends on the fourth day, and ſo on. If now the paroxyſms are ſo protracted in ſuch an intermitting tertian, that a ſecond begins before the firſt is perfectly ended,

and a third like the firſt comes on before the ſecond terminates, ſuch a fever will be called continual, becauſe it is never perfectly off from the patient; but at the ſame time it will be alſo called remitting, becauſe there is obſerved a remarkable remiſſion or abatement of the fever, which is in a ſhort time followed with a new exacerbation or increaſe. The ſame thing may alſo take place in the protracted fits of a quotidian fever; and alſo in the protracted and triplicate acceſſions of a quartan, which ſometimes degenerates into a continual remittent of this kind very difficult to diſcover rightly, eſpecially if each paroxyſm comes on at different hours; and alſo when they anticipate the uſual time of their invaſion; for then the order of the fits ſeem to be ſo much diſturbed, that it is very difficult to diſtinguiſh to which claſs the fever properly belongs. Of this nature ſeem to have been thoſe erratic fevers as they are called by Hippocrates [n], concerning which he has the following paſſage: *At intermittentes, & erratico modo prehendentes, autumno maxime, in quartanam ferè tranſeunt: & magis illis, qui triginta annos exceſſerunt.* "The fevers which ſeize the patient "after the manner of a erratics and intermittents, "chiefly in autumn, turn almoſt into a quartan, "more eſpecially in thoſe who are above thirty "years of age." And again he obſerves: *In febribus erraticis, nigræ nubeculæ (in urina) quartanam ſignificant.* "That black clouds in the urine "in erratic fevers denote a quartan [o]." Sydenham [p] has obſerved ſuch fevers as ſeemed to be continual, though they properly belong to the claſs of

[n] Coac. Prænot. N°. 144. Charter. Tom. VIII. pag. 859.
[o] Ibid. N°. 582. pag. 887.
[p] Sect. I. cap. 2. pag. 49.

of intermittents, and makes the following remark upon them, which deſerves well to be remembred in practice: *Cum præmature menſe Julio, v. g. intermittentes autumnales ingrediuntur atque increbreſcunt, non ſtatim genuinum typum induunt (quod intermittentibus vernis quidem ſolenne eſt) ſed continuas febres ita per omnia imitantur, ut, niſi caſtigatiſſimo utraſque examine trituraveris, ab invicem diſcriminari non poſſint; at retuſo pauliſper conſtitutionis impetu, & frænata vi, jam in typum regularem migrant, atque exeunte autumno, larva abjecta, intermittentes ſe eſſe, quales ab initio reapſe fuerunt, palam fatentur; ſive Quartanæ illæ fuerint, ſive Tertianæ: quod ſi non diligenter animadvertimus, cum magno ægrorum noſtrorum malo medicantes hallucinabimur, dum hujuſmodi febres, quæ ex intermittentium numero ſunt, pro continuis veris & genuinis habeantur.* "When autumnal intermittents in-
" vade and become frequent before their uſual
" time, as for example in the month of July,
" they do not immediately put on their genuine
" character, which we uſually obſerve in vernal
" intermittents; but they ſo nearly reſemble con-
" tinual fevers in all reſpects that they cannot be
" diſtinguiſhed from each other, but by ſifting
" out their nature by the ſtricteſt enquiry; but
" the violence of the diſeaſe being a little ſubdued,
" the fever appears in its regular character, and
" throwing off the maſk in the decline of autumn,
" every one may plainly ſee that they are inter-
" mittents, as they really were at the firſt, whe-
" ther they were quartans or tertians: which if
" we did not carefully obſerve we might be de-
" ceived in the cure, to the great detriment of our
" patients, when ſuch fevers which are of the
" number of intermittents, are miſtaken for true
" and genuine continual fevers."

It is alſo to be obſerved that intermittent fevers are ſo called when the paroxyſms return at ſtated intervals, as on the third day in a tertain, on the fourth day in a quartan, &c. For when a continual fever ceaſes without a good criſis, the patient ſhall often be without the fever for ſeveral days, and then return again; but ſuch a fever cannot for that reaſon be properly referred to the claſs of intermittents. For in that caſe it is called a new relapſe, or a return of the diſeaſe, which tho' it frequently happens on a critical day, yet it never falls out upon a certain definite time, as we obſerve in the fits of intermitting fevers. See concerning this what has been ſaid in the comment to § 564.

Having now explained the different kinds of fevers, we are next to treat of ſuch things as occur, and deſerve to be remarked in each of theſe kinds.

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